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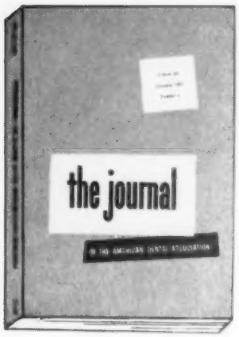

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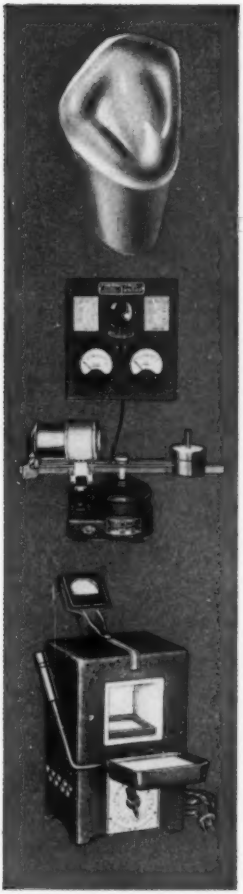

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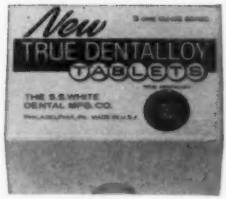

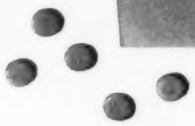

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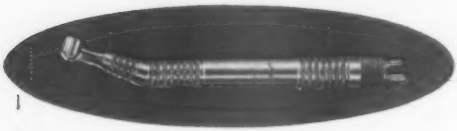

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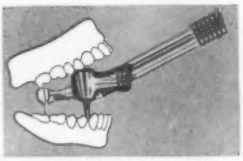

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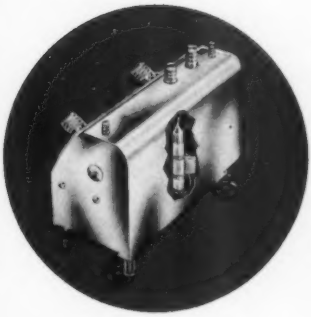

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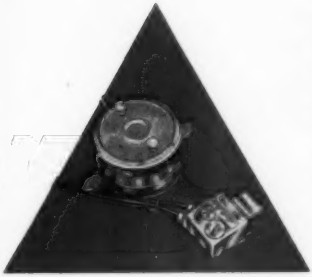

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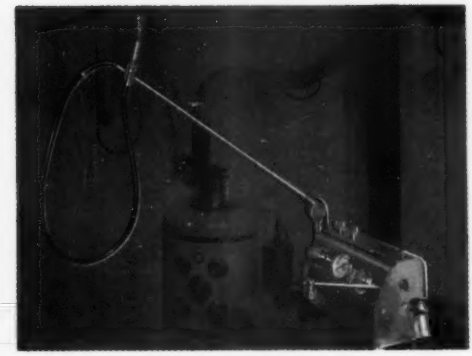

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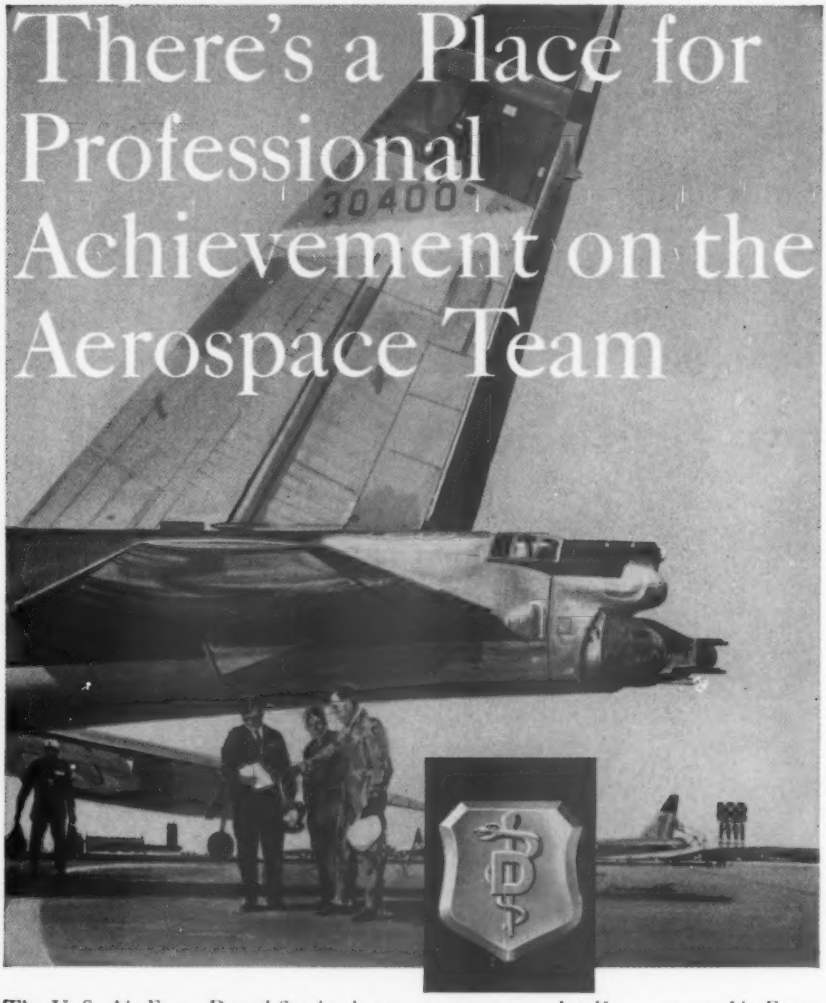

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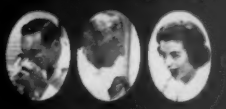

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Roentgenographic study of eruption

Donald B. Shumaker, D.D.S., M.S., Detroit,
and Mahmoud S. El Hadary, B.Ch.D., M.S., Ann Arbor, Mich.*

The calcification and eruption of five mandibular permanent teeth were studied in serial roentgenograms made annually in 26 girls and 31 boys. At the stage of crown completion, all teeth begin to move toward occlusion. About five years elapse between crown completion and occlusion. Girls and boys have the same pattern of eruption, but girls are ahead of boys in eruption of the five permanent teeth studied, except for the permanent first molar which reaches full eruption at seven years for both girls and boys.

The most extensively examined phase of the eruption process has been the intraoral stage. In only a few studies has the intrabony phase of eruption been adequately observed. Carlson,[1] Pinney[2] and Nolla[3] studied the developing tooth as it progressed from maturation of the crown to root completion.

Nolla's study was based on annual serial roentgenograms of 25 boys and 25 girls obtained from the files of the University of Michigan Elementary School Growth Study. These were studied in order to develop an accurate procedure for the detailed roentgenographic appraisal of the development of the permanent dentition. The development of each tooth was graded on a scale from 0 to 10. Each set of observational appraisals was summarized, both graphically and numerically. Few developmental differences were found between corresponding right and left teeth. No significant differences in the rate of development were observed between boys and girls. However, in girls dental development started earlier and finished earlier. The general type of growth displayed by each tooth was the same. The statistical summary of individual tooth development permitted the preparation of detailed growth age scales which facilitate clinical application of the results.

The problem of relating calcification and eruption is one that has been studied extensively. Orban[4] stated that the eruption of a tooth is a matter of root elongation. He concluded that Hertwig's epithelial sheath remains at a fairly constant position while the growth of a tooth takes place. Carlson[1] found that in some teeth the elongation of the root and occlusal movement of the crown need not occur together. On the other hand, Brash[5] observed that eruption of teeth starts with the formation of the crypt and continues with alveolar bone growth. However, Broadbent[6] reported that crypt migrates through bone even before dental calcification is detectable roentgenographically.

Schour and Massler[7] explained that calcification and eruption are two distinct processes that do not necessarily correspond to those of chronological age. They stated also that when the roots are approximately one-half calcified, the teeth are ready to assume their places in the mouth. Later Maddern[8] said that movement of teeth begins with the earliest elaboration of the crown and that motion within the osseous structures of the jaws was created in response to the activities of the attached muscles. Diamond[9] reported that once a crown is completely calcified, it is ready to migrate or move through the jaw. Reichborn-Kjennerud[10] investigated the mechanism of permanent tooth eruption and concluded that the tooth is displaced occlusally by the formation of new bone around its apex and that its development and eruption are accompanied by resorption and regeneration of the alveolar process. Dienstein[11,12] noted that the initiation of root formation appears to stimulate eruption. Brodie[13,14] and Carlson[1] agreed with Diamond[9] that the permanent teeth do not move occlusally until root formation has begun. There is, then, varied opinion as to the actual relation between calcification and eruption.

The studies of the sequence of eruption also show little general agreement. Such studies mostly have been carried out at the end of eruption; that is, the sequence is established when the tooth emerges through the gingival tissue.

Lo and Moyers[15] found the most frequent sequence of eruption in the mandible to be 6 1 2 3 4 5 7. James and Pitts[16] found the most common sequence to be 6 1 2 4 3 5 7, but Kihlberg and Koski[17] reported a sequence of eruption of 6 1 2 4 5 3 7 for both the maxilla and mandible.

In one of a current series of papers dealing with calcification and eruption, Garn and Lewis[18] (in 1957), reporting on the sequence of eruption in the mandible, found that when the development of 5 preceded that of 7, the eruption of 5 also preceded that of 7. However, when the development of 7 preceded that of 5, 7 erupted before 5 in only 50 per cent of such instances.

In their 1959 paper Garn, Lewis and Polacheck[19] reported a much greater variability in age of initiation and completion of crowns and roots of the permanent teeth than had been recorded previously. This may explain many of the conflicting observations on dental development which were based on smaller samples.

MATERIALS AND METHOD

The materials used were right lateral jaw roentgenograms from the files of the University of Michigan Elementary School Growth Study. The teeth studied were the mandibular right permanent cuspid, first and second bicuspids, and first and second permanent molars. Twenty-six girls[20] and 31 boys were studied. All records were taken at yearly intervals as closely as possible to the child's birthday. The number of annual films per child ranged from 6 to 13 with a mean of 7.2 roentgenograms for the girls and 7.6 for the boys.

The following structures were identi-

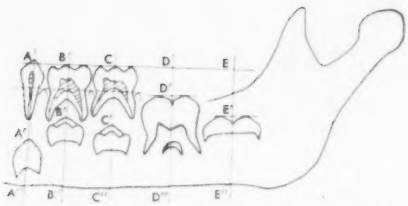

Fig. 1 • Diagram of structures and reference lines

fied and used to obtain the measurements (Fig. 1):

1. Deciduous cuspid (cusp tip A), first deciduous molar (mid-point of occlusal surface B), and second deciduous molar (mid-point of occlusal surface C).

2. Permanent cuspid (cusp tip A′), first bicuspid (cusp tip B′), second bicuspid (cusp tip C′), first permanent molar (D′ at buccal groove of occlusal surface).

3. The outline of the lower border of the mandible.

Each roentgenogram was traced, and the measurements taken from arbitrary lines were constructed as follows:

1. The occlusal line was made by joining the cusp tips of the deciduous molars and extending the line anteriorly and posteriorly (A,B,C,D,E).

2. A and A′ were joined and the line extended to intersect both the occlusal and mandibular lines. The same was done for the points B-B′, and C-C′. This gave the lines A A′ A″, B B′ B″, C C′ C″.

3. A line was drawn connecting the cusp tips of both the first and second permanent molars. A perpendicular was constructed to this line passing through the buccal groove and extended to the occlusal and mandibular lines. This formed the lines D D′ D″, and E E′ E″. The measurements of line A A′, B B′, C C′, D D′, E E′ were referred to as X. The measurements of A′ A″, B′ B″, C′ C″, D′ D″, E′ E″ were referred to as Y. The per cent of eruption of any given tooth was then determined by the formula:

$$\text{per cent of eruption} = \frac{Y}{Y - X}$$

The development of each tooth in each roentgenogram used in the study was recorded according to Nolla's stages.[3]

The collected data were plotted using the stage of development and per cent of eruption as ordinate and abscissa respectively. The corresponding age of the child is also shown on the vertical axis. Figure 2 illustrates this method using the cuspid as an example. From these data the graphs in Figure 3 were constructed relating age in years to per cent of eruption.

RESULTS

By relating the per cent of eruption and the stage of calcification of the developing teeth, the following findings were elicited (Fig. 3):

Cuspid • Up to stage 6, the cuspid moves only slightly toward occlusion. Between stages 6 and 7, it begins to move more rapidly toward occlusion, reaching full eruption at approximately ten years in girls and ten years and four months in

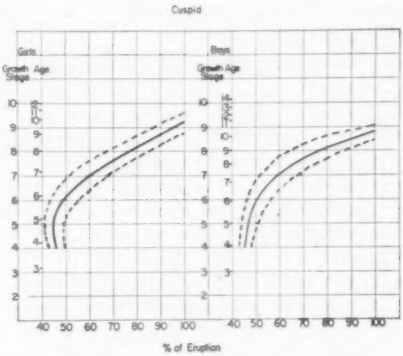

Fig. 2 • Stage of development of child and per cent of eruption of cuspid

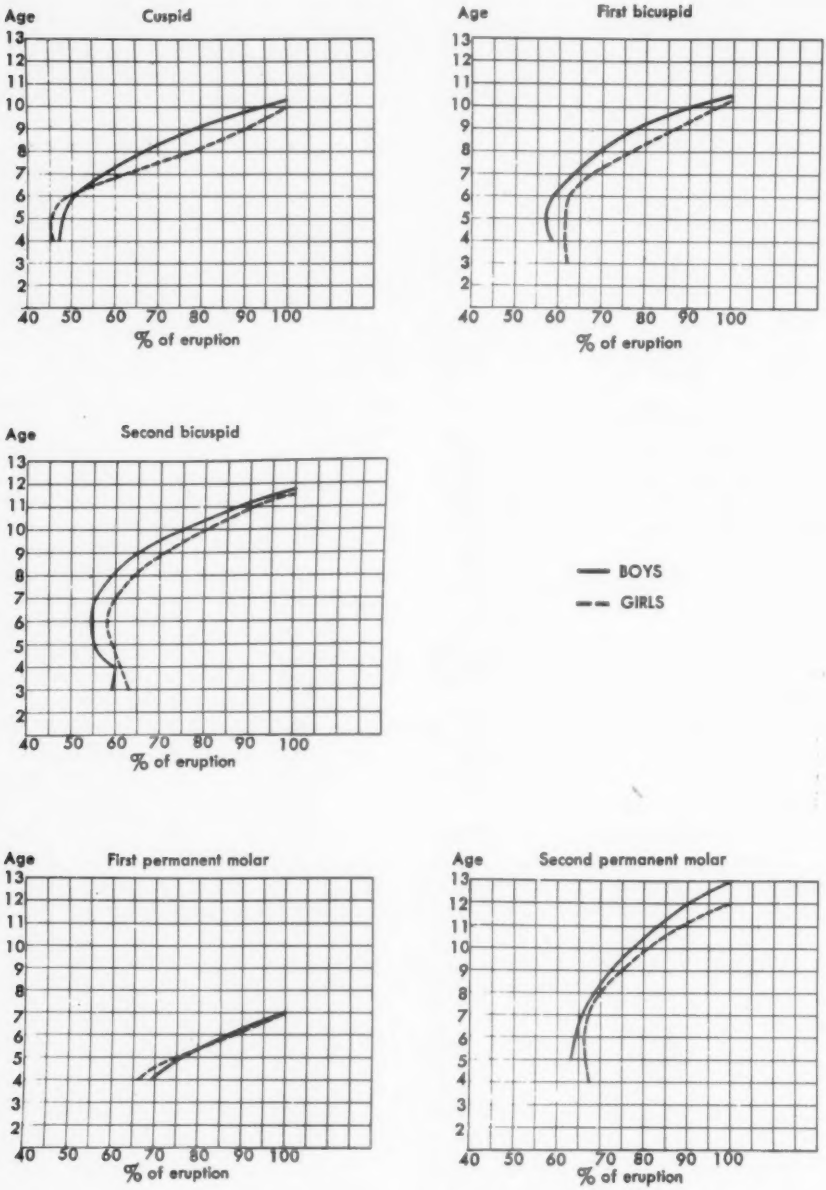

Fig. 3 • Age in years and per cent of eruption

boys. For both sexes the time involved for eruption from complete crown formation (stage 6) to occlusion was approximately four and one-half years. The general pattern of eruption was the same for both sexes except that the girls were ahead of the boys.

First Bicuspid • Until stage 6, there is little increase in the amount of eruption of the first bicuspid (girls, 1 per cent; boys, 2 per cent).

After stage 6, or complete crown formation, the movement toward occlusion becomes more rapid for both sexes.

This tooth reaches full eruption at approximately ten years and four months in girls and ten years and six months in boys. Slightly less than five years are involved from crown formation to occlusion of the first bicuspid (Fig. 3). During stages 3 to 4, a decrease in the distance from the crown tip to the border of the mandible was noted.

Second Bicuspid • In general, the eruption curve of the second bicuspid follows the same pattern as the first bicuspid, that is, after stage 6 or complete crown formation, movement toward occlusion becomes more rapid in both sexes. This tooth reaches full eruption at 11 years and 6 months in girls and 11 years and 9 months in boys. Approximately 5 years are involved between crown formation and full eruption. As in the first bicuspid, a decrease in the distance from crown tip to the lower border of the mandible was noted during stages 3 to 4.

First Permanent Molar • At stage 6, the first permanent molar moves rapidly toward occlusion and reaches full eruption at seven years for both girls and boys. This is the only tooth studied which reaches full eruption at the same age in both girls and boys.

Although this tooth was erupting at the time of the first observations of this study, it appears to have a pattern comparable to those for other teeth after stage 5.

Second Permanent Molar • The curve for the second permanent molar is similar to the bicuspid curves for both sexes except that the rate of eruption is slower throughout.

The second molar reaches full eruption at approximately 12 years in girls and 13 years in boys. About five years are involved between crown formation and full eruption.

Sequence of Eruption • The sequence of eruption of the mandibular teeth on reaching occlusion was found to be 6 3 4 5 7. The sequence of eruption pattern was also observed at ages 4, 7, 9, 11 (see the table). It was found that the apparent eruption sequence varied throughout those years. That is, the relative position of the teeth studied changed as they moved toward occlusion.

Variability • The amount of variability expressed as plus and minus one standard deviation of the percentage of eruption is illustrated in Figure 2. It is closely similar for all the teeth studied and for each sex and is less than 5 per cent for most growth stages. Thus for the cuspid of boys at growth stage 6, the percentage of eruption ranges from 46 to 56 per cent in two thirds of the sample studied.

CONCLUSIONS

1. It is possible by means of the examination of tooth development to approximate the amount of eruption of a given tooth.
2. Each tooth starts to move toward occlusion at approximately stage 6 or crown completion (Fig. 3).
3. Approximately five years are involved from crown completion and beginning eruption to occlusion (Fig. 3).
4. Girls and boys have the same pattern of eruption, but girls are ahead of

Table • Sequence of eruption at different ages*

	Age 4		Age 7		Age 9		Age 11	
	Girls %	Boys %	Girls %	Boys %	Girls %	Boys %	Girls %	Boys %
Cuspid	46	47	58	57	91	77	100	100
First bicuspid	62	59	66	63	87	76	100	100
Second bicuspid	62	60	60	56	72	66	94	86
First molar	66	69	100	100	100	100	100	100
Second molar	64	63	67	66	75	73	93	84
Sequence	67453	67543	67453	67435	63475	63475	63457	63457

*It is seen that the relative positions of the teeth change as these teeth erupt toward occlusion. The sequences were derived from the per cent of total eruption achieved.

boys except for the first permanent molar (Fig. 3).

5. The teeth studied reached occlusion before their development was completed (Fig. 2).

6. The sequence of eruption as the teeth arrive at occlusion was found to be 6 3 4 5 7 for both sexes (table).

SUMMARY

The calcification and eruption of the mandibular permanent cuspid, first and second bicuspids and first and second permanent molars were studied in serial roentgenograms. It has been shown that there is a relationship between tooth development and movement toward occlusion. However, it does not appear to be a direct linear relationship; that is, as the developing tooth adds length, a corresponding amount of eruption does not necessarily occur.

Through the first six stages of development there is very little eruption. At approximately stage 6 or crown completion, all teeth begin to move toward occlusion.

A slight decrease in distance from the lower border of the mandible to crown tip was noted in some of the teeth for both sexes. This observation was most noticeable in bicuspids; however, it would be hazardous to assume from the data of this study that the distance from the crown tip to the lower border of the mandible actually decreased. If it is assumed that the crown tip remains relatively stationary in its vertical position in the mandible, then it must be concluded that the alveolar border grows appositionally more than the lower border of the mandible prior to crown completion. This observation is consistent with the works of Brash,[5] Craven[21] and others who found the most active growth occurring at the alveolar border.

From plotting age as "Y" axis and per cent of eruption as "X" axis, a similarity in pattern for girls and boys is noticed (Fig. 3). In general, girls are ahead of boys in eruption of any of the five permanent teeth in the study except for the first permanent molar when both sexes achieved 100 per cent eruption at seven years.

The sequence of eruption of the teeth studied as they reached occlusion was 6 3 4 5 7. However, the intrabony sequence of eruption was found to vary at different ages. *18551 East Warren*

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*Research assistant, University of Michigan Elementary School Growth Study, department of orthodontics, School of Dentistry, University of Michigan, Ann Arbor, Mich.

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Popularization of Science • The aims of the popularization of science are numerous and of considerable significance. It continues, corrects and fills the gaps in school education which inevitably lags behind the march of progress; it arouses the desire to take up research and is thus of direct benefit to creative science; it likewise benefits creative science by acquainting the public at large with its power and efficiency, thus providing science with a hearing and with the support of public opinion; it creates a link between specialists in different disciplines, since it is popularization which ensures that the physicist is not altogether unaware of what is happening in biology nor the biologist of what is going on in the realm of physics; it keeps—or could keep—politicians informed—and politicians have an ever greater need to be familiar with scientific developments.

But indeed it is undeniable that these various functions, however important, do not take into account the true and specific function of popularization which is purely and simply to introduce the greatest number of people into the soverign dignity of knowledge; to ensure that the great mass of people should receive something of that which is the glory of the human mind and not to be kept apart from the momentous adventure of our kind; to bring man closer to man by striving to reduce the terrible if invisible gulf of ignorance; to struggle against mental starvation and the resulting under-development by providing every individual with a minimum ration of spiritual calories. . . .

In a word, the ideal of the popularization of science (and here lies its moral value) is to develop and assist a community of thought. It is the reverse of Renan's aristocratic concept whereby an uncultivated multitude should become the ward of a handful of the "informed". . . . *Jean Rostand. Science 131:1491 May 20, 1960.*

Effect of geographic location and race on gingival disease in children

Eugene R. Zimmermann, D.D.S., Dallas, Texas, and William A. Baker,† D.D.S., Phoenix, Ariz.*

The prevalence and severity of periodontal disease was assessed in 529 white children from Prince Georges County, Md., and in 435 white children from Dallas, Texas. A group of 442 Dallas Negro children was also examined. All children were 6 to 12 years old and represented the low socioeconomic class in their respective communities. The Texas white and Negro children had more severe gingival disease in all age groups than the Maryland children. In the 6 to 9 year old group, Negro children had slightly higher periodontal scores than the Dallas white children; in the 10 to 12 year old group, Negro children had much higher periodontal scores than the white children. Both white and Negro Dallas children in the accelerated classes had significantly lower periodontal scores than the children in the nonaccelerated classes.

During the past 20 years investigators in dental research have devoted considerable time and effort to studying the role of biological, physical and chemical agents in periodontal disease. Recently, several authors have shown that socioeconomic factors, geographical location and race also influence the extent of periodontal disease in different populations.

Studies of socioeconomic factors[1,2] show that the educational level primarily, and the economic status secondarily, modify the severity of gingival disease in certain groups of adults and children in the United States.

The prevalence of gingivitis in children varies considerably in different localities, especially when three different indexes are used to record gingival disease. When measured by the PMA Index[3] gingivitis was prevalent in 23 per cent of the white children 6 to 12 years of age in a Boston suburb,[4] 51 per cent in Philadelphia and 74 per cent in Chicago.[5] In Canada, Brantford showed a 59 per cent prevalence, Sarnia a 62 per cent and Stratford a 77 per cent.[6]

Marshall-Day,[7] using another method of evaluating gingival disease in children 6 to 12 years of age, found gingivitis prevalent in 70 per cent of the children in Rochester, N. Y., 75 per cent in Puerto Rico, 54 per cent in the Virgin Islands and 74 per cent in India.

In a composite survey of gingival disease in the United States,[8] Russell,[9] using

the Periodontal Index, reported gingivitis prevalent in approximately 18 per cent of 5 to 14 year old white children and a mean score of 0.06.

Massler,[5] Russell,[8] and Marshall-Day[7] have presented information on the relationship of race to gingival disease in children. Only the latter author found Negro children with less gingivitis than comparable white children.

Neither the prevalance nor the severity of periodontal disease in children living in the Southwestern part of the United States has been previously reported. The present study was undertaken for two reasons: (1) to compare the extent of periodontitis and gingivitis in white Southwestern (Texas) children with that in a group of Eastern (Maryland) children of similar socioeconomic level and (2) to compare the prevalence and severity of gingival disease in white and Negro children of similar socioeconomic level who live in the same city (Dallas).

METHODS

White and Negro children in Dallas were selected for comparison of gingival health with a group of white children in Prince Georges County, Md., a suburb of Washington, D. C. The Maryland children were examined by the senior author. They represent the low economic group of children in this county. After calibrating the results of the examinations, the Texas children were examined by the second author. Although the Dallas children represent the low economic group in this county, they come from families whose median income is slightly lower than the Maryland group.[10,11] Children of Mexican parentage comprised 22 per cent of the Dallas white children. Information on the socioeconomic status of the children was confirmed by teachers, principals and nurses from their personal knowledge of the individual children and their family background.

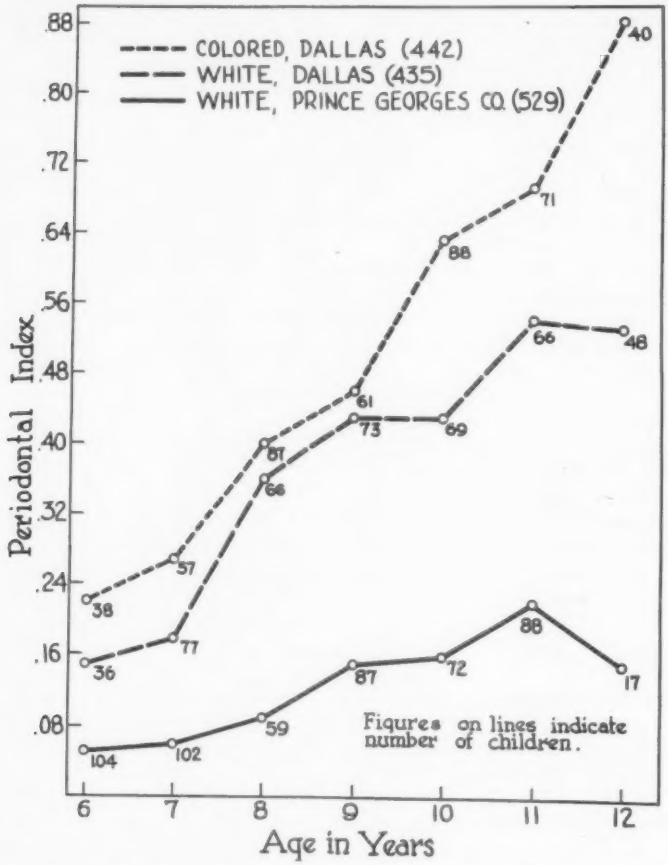
The Periodontal Index of Russell[12] was used to record the prevalence and severity of gingival disease in all children in this study. The Maryland children were examined with the following equipment: mouth mirrors, explorers, Jacquette scalers and a Castle light; the Texas children were examined with mouth mirrors, explorers, William's probes and a surgical gooseneck lamp. Although the Maryland and Texas children were examined in different years, the examinations were conducted in the same calendar month of each year (the Texas children were examined approximately ten weeks after the influenza peak in Dallas).

RESULTS

In sorting punch cards by race, age and sex the authors noted that the children of Mexican descent had periodontal scores similar to those of the other children and for this reason, their findings were included in the white group's results.

Geographical Location • Regardless of race, the Texas children had more severe gingival disease than the Maryland children (see illustration). At each age group, the difference between the Maryland and Texas children is statistically significant at the .05 level of probability. Gingivitis was prevalent in 35 per cent of the entire group of Maryland children and the mean score was 0.12. The Texas white children showed a 79 per cent prevalence with a mean score of 0.38 and the Negro children a 67 per cent prevalence with a mean score of 0.51.

Race • The Negro children had higher periodontal scores than both groups of white children. In a comparison of Negro and white children in Texas, the difference in gingival health became more pronounced with increasing age so that by the age of ten years, the Negro children had significantly higher periodontal scores



Comparison of periodontal scores in school children in Dallas, Texas, and Prince Georges County, Md.

than the white children. Although the Negro group had more severe gingivitis than both white groups it should be noted that none were found to have pocket formation present (Table 1). The highest prevalence of gingival disease in all age groups was found in the ten year old white boys in Texas since only 3 per cent were free from disease (Table 2). The 11 year old white boys in Maryland had more periodontitis (pocket formation) than any other age group (Table 3).

Sex • No statistically significant differences in gingival disease were observed between boys and girls in white or Negro children. However, in age group comparisons the Negro and white girls had higher periodontal scores than the boys in 60 per cent of the cases.

Class Assignment • It was not discovered until the end of the survey that in the Dallas school system the children in each grade are divided into two classes: accel-

Table 1 • Periodontal Index status of Negro boys and Negro girls in Dallas, Texas

Mean age, years	Number examined	Periodontal Index status		
		Per cent negative	Per cent with pockets	Mean score
Boys				
6.8	12	67	0	.04
7.5	19	37	0	.36
8.5	42	33	0	.44
9.4	22	27	0	.43
10.6	40	30	0	.61
11.4	29	28	0	.67
12.5	19	21	0	.96
Girls				
6.7	26	54	0	.30
7.3	38	44	0	.22
8.5	45	42	0	.37
9.5	39	26	0	.48
10.4	48	25	0	.65
11.4	42	24	0	.70
12.4	21	19	0	.81

erated and nonaccelerated. Children who have superior intelligence quotients or those with an average degree of intelligence but with a high desire to learn are placed in the accelerated class. The remainder of the children are placed in the nonaccelerated class. Both Negro and white children in the accelerated classes had significantly lower periodontal scores than the children in the nonaccelerated classes (Table 4).

DISCUSSION

Although the method of examination and the criteria of disease severity were not identical in all of the previously mentioned studies, one general conclusion can be drawn from their findings: geographic location influences the extent of gingival disease in children. The present study shows that with one important factor (economic level) held constant, a significant difference in prevalence and severity of gingival disease still occurs in two widely separated groups of children. This geographic variation in gingivitis may indicate differences between both groups in dental health education, dental care, oral hygiene habits and nutrition.

In this study the Negroes had a lesser prevalence but a greater severity of gingival disease than white children who lived in an adjacent neighborhood. Although the difference in periodontal scores was minor in the 6 to 9 year old children, the 10 to 12 year old Negroes had scores not only significantly higher than the Dallas white group but also equal to or higher than the scores of a group of 21 year old Singapore subjects studied by McCombie.[13] It is difficult to evaluate whether the greater severity of gingival disease in Negroes is due to their race per se, or to certain environmental factors associated with their race; for example, their usually low economic status and educational level.

This racial difference in periodontal scores is partially reduced in the Dallas schools by classroom assignment; that is,

Table 2 • Periodontal Index status of white boys and white girls* in Dallas, Texas

Mean age, years	Number examined	Periodontal Index status		
		Per cent negative	Per cent with pockets	Mean score
Boys				
6.6	17	41	0	.22
7.5	41	41	0	.18
8.5	29	21	0	.33
9.5	34	9	0	.35
10.4	34	3	3	.38
11.4	32	16	0	.46
12.5	21	19	0	.50
Girls				
6.7	19	58	0	.09
7.5	36	39	0	.17
8.5	37	22	0	.41
9.4	39	8	0	.50
10.5	35	17	3	.47
11.5	34	6	0	.62
12.4	27	15	0	.56

*Children of Mexican parentage are included.

Table 3 • Periodontal Index status of white boys and white girls in Prince Georges County, Md.

Mean age, years	Number examined	Periodontal Index status		
		Per cent negative	Per cent with pockets	Mean score
Boys				
6.6	51	84	0	.04
7.5	59	68	0	.06
8.4	23	65	0	.09
9.5	43	49	0	.19
10.5	38	58	0	.15
11.4	45	44	7	.28
12.3	8	63	0	.19
Girls				
6.5	53	79	2	.07
7.4	43	67	0	.07
8.4	36	67	0	.09
9.5	44	64	2	.11
10.4	34	59	0	.17
11.4	43	61	0	.17
12.4	9	67	0	.11

Negro children in the accelerated classes often had periodontal scores lower than white children in the nonaccelerated classes. The periodontal scores of white and Negro girls were more affected by classroom assignment than the boys' scores. Regardless of race, the girls in the accelerated classes had the lowest group scores whereas girls in the nonaccelerated classes had the highest group scores.

In a recent study in Birmingham, Ala.,[14] Negro adults had higher periodontal scores than white persons of the same age, but when persons of both races with equal educational background and occupational status were compared, this difference in scores was reduced. In the present study when Negro and white children of equal intelligence and industry were compared most of the difference in severity disappeared. For further evaluation of this factor a comparison of the educational and occupational status of the parents whose children were in this study is indicated.

SUMMARY

The prevalence and severity of periodontal disease was studied in 529 white children from Prince Georges County, Md., and 435 white children from Dallas, Tex. A group of 442 Dallas Negro children was also examined. All children were 6 to 12 years of age and although they represent the low socioeconomic class in their respective communities, the Dallas groups came from families with a lower median annual income. Russell's Periodontal Index was used for assessing gingival disease and the examination methods and equipment were comparable.

1. The Texas children, regardless of race, had more severe gingival disease in all age groups than the Maryland children. The differences are statistically significant at the .05 level of probability.

2. The 6 to 9 year old Negro children had slightly higher periodontal scores than the Dallas white children. The Negro children in the 10 to 12 year old group had much higher periodontal scores than the white children and the

Table 4 • Periodontal scores in white and Negro Dallas school children in accelerated and nonaccelerated classes

Group	Number			Mean Periodontal Index	Standard error of mean
	Boys	Girls	Total		
Accelerated classes	113	209	322	0.36*	±.03
Nonaccelerated classes	278	277	555	0.50*	±.03

*The difference between the means is significant at the .001 level of probability.

differences are significant at the 0.05 level of probability.

3. Sex differences in the prevalence and severity of gingivitis were small and random in both Negro and white children.

4. Both white and Negro Dallas children in the accelerated classes had significantly lower periodontal scores than the children in the nonaccelerated classes. These differences are significant at the 0.001 level of probability.

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*Professor and chairman of department of oral pathology and public health, Baylor University College of Dentistry.

†Formerly graduate student in department of periodontology, Baylor University College of Dentistry.

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Hazards of Ionizing Radiation • The dramatic exploitation of nuclear energy for military and peacetime purposes has made informed persons acutely aware that man-made ionizing radiation, whatever its source, is now an important addition to a constantly changing list of hazards to human existence and well-being. Exposures from medical uses in technologically advanced nations are now about equal to background and need to be taken into account to a corresponding degree.

Insofar as the uses of nuclear energy add radioactive contaminants to the general environment of man, and especially to the atmosphere, important moral issues arise even though the magnitude of the radiation to the germ line is now small relative to natural background levels. These new uses make possible, for the first time in human history, the inescapable exposure of world populations, in some instances without consent, to additional radiation undetectable by the unaided human senses and capable of producing deleterious changes in the hereditary material.

Although it is not the special province of natural science by itself to say how these issues should be resolved, it is surely a grave and urgent responsibility of geneticists to make the best possible estimates of the magnitude of the genetic effects of small increments of ionizing radiation and to take action in adding to and improving the store of knowledge on which such estimates are based. Only in this way can the needed quantitative refinements be made in the rather crude estimates that have already been made. *National Academy of Sciences of the United States. The Research Frontier. Saturday Review June 4, 1960, p. 48.*

Reduction of salivation by addition of methantheline bromide to local anesthetics: a preliminary report

Allen M. Olinger, Jr., D.D.S., San Francisco*

A double blind study indicates that the addition of 2.0 to 2.5 mg. of methantheline bromide per cubic centimeter of local anesthetic solution administered parenterally will effectively suppress secretions of the salivary glands during dental procedures. The addition of methantheline bromide to the local anesthetic solution shortened the duration of anesthesia, but the depth of anesthesia was increased. No appreciable increase in side effects was noted. Satisfactory dryness of the mouth was produced in over 90 per cent of the patients.

Clinical dentistry has long been impeded by fluids within the oral cavity: many technics are made more difficult by the flow of saliva, and moisture is detrimental to most dental materials. Therefore, many methods have been resorted to in the attempt to keep operative fields fluid-free and uncontaminated. However, current approaches are still far from ideal so that this study was undertaken in an effort to develop practical control of salivary flow by the use of an antisalivary drug.

The literature on the control of sialorrhea reveals that both natural and synthetic anticholinergic agents have been used with advantage,[1] if not complete satisfaction. In fact, Copen[2] reported on the addition of atropine to dental local anesthetics and De Bré[3] used methantheline bromide (Banthine Bromide) given orally as an antisialogogue in dentistry. The many systemic actions of atropine would seem to preclude its general use for this purpose. Methantheline bromide, however, is somewhat less potent than the natural alkaloid in suppressing parasympathetically innervated secretions and also induces fewer side effects.[4, 5] Thus, it offered a promising possibility. De Bré found that 50 to 100 mg. was required orally for controlling salivation but at these levels the drug also actively suppressed gastric secretions and motility for prolonged periods. Hence, administration by mouth proved unsatisfactory in dentistry.

Pharmacological studies in experimental animals have shown that gastrointestinal absorption of methantheline is such that oral doses 50 to 200 times intravenous mean effective doses (ED_{50}) are required to produce comparable effects on the cervical sympathetic ganglia.[6]

The drug intravenously is highly antisialorrhetic, 0.1 mg. of the chloride derivative completely inhibiting the salivary secretion response to electrical stimulus of the chorda tympani nerve in anesthetized dogs.[6] These data suggest that adequate control of saliva flow might be obtained by parenteral administration of small doses without inducing excessive side effects. Combination of the anticholinergic agent in the dental local anesthetic solution offered an obvious approach for easy administration.

PRELIMINARY STUDIES

Because there are frequent quantitative discrepancies between animal and human data, the possibility existed that other anticholinergic agents might be better suited to the purpose. Therefore, as a preliminary screen, over 600 patients received common local anesthetic solutions which had been combined with methantheline bromide, propantheline (Pro-Banthine) bromide, penthienate (Monodral) bromide, atropine methyl nitrate or atropine sulfate. Statistical evaluation of the accumulated data confirmed that, with respect to onset time, duration of dryness and side effects, methantheline was best suited to use in dental procedures.

The compatibility of methantheline bromide with formulations of eight widely known dental local anesthetics was investigated to insure that combination did not result in deleterious effects on any of the active ingredients.

Finally, a pilot study to determine optimum dose was undertaken. Methantheline bromide, in concentrations ranging from 1.66 to 5 mg. per cubic centimeter was combined with the following dental anesthetic solutions:

1. Lidocaine (Xylocaine) hydrochloride 2 per cent with epinephrine 1:50,000.
2. Lidocaine hydrochloride 2 per cent with epinephrine 1:100,000.
3. Lidocaine hydrochloride 2 per cent with levarterenol (Levophed) 1:30,000.
4. Procaine (Novocaine) hydrochloride 2 per cent, tetracaine (Pontocaine) hydrochloride 0.15 per cent, nordefrin (Cobefrin) 1:10,000 (NPC).
5. Procaine hydrochloride 2 per cent, tetracaine hydrochloride 0.15 per cent, levarterenol 1:30,000 (NPL).
6. Propoxycaine (Ravocaine) hydrochloride 0.4 per cent, procaine hydrochloride 2 per cent, levarterenol 1:30,000 (RNL).
7. Propoxycaine hydrochloride 0.4 per cent, procaine hydrochloride 2 per cent, levo-nordefrin (Neo-Cobefrin) 1:20,000 (RNN).
8. Hexylcaine (Cyclaine) hydrochloride 1.0 per cent.
9. Procaine hydrochloride 2.0 per cent, epinephrine 1:50,000.

In some instances hyaluronidase and meperidine (Demerol) hydrochloride were also administered concomitantly.

Observations in approximately 875 injections supported the initial hypothesis that methantheline bromide could be combined with dental anesthetics safely and suppress salivation during the period of operative anesthesia. Moreover, as Hambourger and co-workers[6] had observed in dogs, it was confirmed that adequate inhibition of salivary flow could be achieved at doses much lower than those required for the profound and long-term secretory control demanded in medical treatment. The most satisfactory concentration appeared to be 2.0 to 2.5 mg. per cubic centimeter of local anesthetic solution.

This relatively low dose also raised the possibility that the drug might have a local antisialogogic action. Animal studies of the response on the side receiving the injection compared with the side not receiving any injection, however, indicated that the drug was absorbed from the injection site and transported through the circulation to the salivary glands on both sides. There was no suggestion that local diffusion to the glands was involved.[7]

CLINICAL EVALUATION

Based on these initial investigations, an extensive double blind clinical appraisal was undertaken.

Procedure • A single anesthetic solution was selected: propoxycaine hydrochloride, 0.4 per cent, procaine hydrochloride, 2 per cent, levo-nordefrin 1:20,000 (RNN). This was used alone or with either 2.0 or 2.5 mg. of methantheline bromide per cubic centimeter. Each preparation was supplied in identical, coded, multiple-dose vials, and the code key was not available to the investigator or his staff. Two differently coded vials were in use at any given time. To avoid any influence on the observations from the codes on the vials, an assistant filled the syringe with a solution not identified to the operator, and entered the code on the clinical data card only after all observations had been recorded.

A Luer syringe was employed for all administrations, and aspiration was done routinely. To reduce variables, 1.0 cc. of solution was employed for all infiltrations and 2.0 cc. for conduction anesthesia. Multiple injections totaling as much as 7.0 cc. were given without untoward reactions.

Data on each patient were assembled on a specially designed record card by the investigator and his assistant. Information on the patient's age, sex, medical and emotional condition was included. The dental procedure and type of injection were recorded, and the degree, onset and duration of anesthesia and xerostomia were noted carefully.

Letter grades were used to record depth of anesthesia with "A" indicating no pain perception after anesthesia developed, "B" meaning the patient discerned only slight pain and "C" signifying that reinjection was required to obtain an operative level of anesthesia.

Dryness was rated as "excessive" (patient discomfort from profound salivary suppression), "satisfactory" (sufficient diminution to permit efficient dental procedures without patient discomfort), "unsatisfactory" (flow still heavy enough to interfere with procedures and materials) and "no effect."

Untoward reactions during or shortly after injection of the anesthetic were recorded as well as any other preoperative or postoperative medications such as tranquilizers or sedatives. Patients were provided with return post cards on which they could report the time of disappearance of dryness and numbness and any "unpleasant effects" noted after leaving the office. In this way postoperative reactions such as hematoma, swelling or paresthesia were determined.

Selection of Cases • The study was carried out sequentially without selection on all patients seen in a general practice. Hence, all age groups and a wide variety of physical and emotional conditions were represented. The treatments employed embraced most dental procedures.

Results • In the course of four years, more than 4,500 injections were made. During the main clinical appraisal period, detailed records were assembled on 1,783 of these. The data were analyzed statistically and the results are summarized in the accompanying tables.

Table 1 summarizes the influence of methantheline bromide at 2.0 and 2.5 mg. per cubic centimeter on various parameters of anesthesia and xerostomia. Volumes injected were comparable, and onset times were similar. However, the propoxycaine-procaine-levo-nordephrine solution (RNN) with methantheline bromide, either 2.0 or 2.5 mg. per cubic centimeter, had a 16 per cent shorter duration than the anesthetic solution without the anticholinergic agent. This difference is highly reliable statistically ($p<0.0001$) and is, therefore, very probably real even though duration figures were missing from many cards. This

Table 1 • Influence of methantheline bromide in a dental anesthetic solution on anesthesia and xerostomia

Solution employed	No. of injections	Average volume injected (cc.)	Anesthesia		Dryness		
			Onset time (min.)	Duration (min.)	Onset time (min.)	Time to maximum xerostomia (min.)	Duration (min.)
Anesthetic solution alone	569	1.85±0.03 (560)*	1.87±0.07 (568)	138.26±3.35 (265)	15.32±1.18 (27)	.....	98.00±21.50 (5)
Anesthetic solution + 2.0 mg./cc. methantheline bromide	725	1.85±0.03 (693)	1.74±0.05 (717)	116.15±2.34 (416)	10.22±0.77 (654)	12.69±1.02 (36)	83.10±2.70 (270)
Anesthetic solution + 2.5 mg./cc. methantheline bromide	489	1.86±0.03 (483)	1.90±0.07 (478)	115.49±2.78 (316)	8.70±0.22 (441)	26.02±10.44 (52)	96.22±4.44 (187)

*Figures in parentheses are the numbers of reports on which each mean and standard error are based.

shortening of duration may be due to the fact that anticholinergic drugs can act as vasodilators[1] and the reduced duration may be an indication that some of the vasoconstrictor action of the anesthetic solution was being antagonized.[5]

The antisialorrhetic effect appeared sooner with the higher dose of anticholinergic agent. It did not prove feasible to determine clinically the time to maximum dryness. Attempts to do so yielded the tabulated results on only a minor proportion of the patients, so further efforts to obtain these data were abandoned. The duration of reduced salivary output appeared to increase with dose of the anticholinergic drug. Dryness, reported in 27 of the control cases with a duration reported in 5, appears to have resulted from variability in clinical response to the anesthetic or from patients with naturally restricted salivary flow. Under the blind test conditions of the study it would be anticipated that some of the control patients would be observed to have less than the normal amount of salivation.

Table 2 outlines the quality of anesthesia and xerostomia obtained with the three solutions. Here it may be noted that the percentage of Grade A anesthesia is somewhat higher for the solutions with methantheline bromide (both 2.0 and 2.5 mg. per cubic centimeter), and the differences are clearly reliable statistically ($p<0.0001$).

Satisfactory diminution of salivation was achieved in a high percentage of all injections of anesthetic solution containing either 2.0 or 2.5 mg. of methantheline bromide per cubic centimeter; however, this was achieved more frequently with the higher dose as might be expected ($p<0.001$).

The percentage of systemic and local reactions with the various preparations appears in Table 3. From this it seems that both the systemic and local tolerance of the anesthetic combination with methantheline bromide is not significantly different clinically from the tolerance of the anesthetic combination itself ($p = 0.15$). It should be noted that, in addition to the usual local anesthetic reactions, systemic side effects likely to result from the anticholinergic agent are included in the tabulation: urinary retention, visual disturbances and excessive

Table 2 • Influence of methantheline bromide on the quality of anesthesia and xerostomia (in per cent ± standard error)

Solution	No. of injections	Degree of anesthesia				Degree of dryness				
		A	B	C	No info.	Excessive	Satisfactory	Insufficient	No effect	No info.
Anesthetic solution alone	569	72.76 ± 1.87	19.85 ± 1.67	7.38 ± 1.10			2.28 ± 0.62	2.64 ± 0.67	94.90 ± 0.92	0.18
Anesthetic solution + methantheline bromide (mg./cc.)										
2.0	725	88.14 ± 1.20	7.86 ± 1.00	3.86 ± 0.72	0.14	1.24 ± 0.41	89.38 ± 1.14	5.24 ± 0.83	3.86 ± 0.72	0.28
2.5	489	86.30 ± 1.55	9.00 ± 1.29	4.70 ± 0.96		0.20 ± 0.20	94.68 ± 1.02	3.48 ± 0.83	1.23 ± 0.50	0.41

dryness. All of these occurred only rarely, the incidence due to methantheline being generally less than 1 per cent. The table makes it apparent that the control of excess salivation was not purchased at the price of an increased incidence of undesirable side effects ($p>0.1$).

COMMENT AND DISCUSSION

Injections of the local anesthetic containing methantheline bromide in the concentrations indicated produce suppression of flow without an increased level of side effects. First evidence of the onset of this suppression is a thickening of the saliva. Thus, the anticholinergic blockade appears to inhibit the serous gland units before the mucous secretory units.

Some medical conditions contraindicate the use of an anticholinergic drug. A possible tendency to increase intraocular pressure precludes use in the presence of glaucoma, and the moderate increase in heart action (which anticholinergic agents often produce if used in adequate dosage) might suggest that they be employed only with caution in those with serious cardiac disease. They should also be avoided in instances of prostatic hypertrophy. However, the small doses found to be effective in this specific application are apparently unlikely to cause more widespread systemic actions.

Assay of methantheline bromide activity disclosed that this anticholinergic drug is not stable in aqueous solution for long periods, the rate of breakdown being directly related to temperature.[8] Within approximately four months, decomposition due to hydrolysis was noted in some solutions as evidenced by the appearance of a white crystalline precipitate. This was isolated and identified as xanthine-9-carboxylic acid, which is the acid from which methantheline bromide is prepared. Therefore, in order to avoid this decomposition, in this study the methantheline bromide in lyophilized form was added to the multiple-dose vials of the local anesthetic solution as used, and the combined solutions were kept at room temperature for not more than several weeks. If vials containing the anesthetic solution and methantheline bromide are prepared individually as required, little likelihood of significant loss of anticholinergic activity exists.

Table 3 • Influence of methantheline bromide in a dental local anesthetic solution—systemic and local reactions. Combined results in per cent ± standard error

Solution	No. of injections	Systemic reactions*													Local reactions							
		None	Urinary retention	Gastrointestinal disturbance	Cardiac symptoms	Tremor	Weakness	Pallor	Impaired coordination	Vision disturbed	Excessive dryness	Headache	Miscellaneous	Reported yes, but not specified	None	Swelling at injection site	Pain, soreness at injection site	Paresthesia	Hematoma	Reported yes, but not specified	Others
Anesthetic solution	569	92.62 ± 1.10		0.35 ± 0.25	4.39 ± 0.86	0.88 ± 0.40	2.99 ± 0.71	1.23 ± 0.46		0.53 ± 0.30			0.53 ± 0.30	0.18 ± 0.18	98.24 ± 0.56	0.53 ± 0.30	1.41 ± 0.49	0.18 ± 0.18	0.18 ± 0.18		0.35 ± 0.25
Anesthetic solution + methantheline bromide (mg./cc.)																						
2.0	725	94.62 ± 0.84		0.14 ± 0.14	1.52 ± 0.45	0.14 ± 0.14	1.93 ± 0.51	0.83 ± 0.34		1.10 ± 0.39	0.41 ± 0.24		1.38 ± 0.43	0.14 ± 0.14	99.31 ± 0.31	0.14 ± 0.14	0.28 ± 0.20		0.14 ± 0.14		0.14 ± 0.14
2.5	489	91.62 ± 1.25	0.20 ± 0.20	1.23 ± 0.50	2.45 ± 0.70	0.20 ± 0.20	2.25 ± 0.67	1.02 ± 0.45	0.20 ± 0.20	1.23 ± 0.50	0.82 ± 0.41	0.61 ± 0.35	1.02 ± 0.45		98.36 ± 0.57	0.20 ± 0.20	0.61 ± 0.35			0.20 ± 0.20	0.61 ± 0.35

*The total per cent is greater than 100 because some patients had more than one reaction.

SUMMARY AND CONCLUSIONS

In an attempt to control salivary secretion which may adversely affect many dental procedures and materials, the anticholinergic drug methantheline bromide was added to various local anesthetic solutions in a series of studies which included over 5,000 injections during a period of five years. On completion of a preliminary investigation, a detailed study was undertaken. In the latter the same anesthetic solution, propoxycaine hydrochloride, 0.4 per cent, procaine hydrochloride 2 per cent, levo-nordefrin 1:20,000 (RNN) was used consistently, and the following solutions were tested clinically: (1) as the control, the anesthetic solution alone; (2) the anesthetic solution with 2.0 mg. methantheline bromide per cubic centimeter added, and (3) the anesthetic solution containing 2.5 mg. methantheline bromide per cubic centimeter. Multiple doses of up to a total of 7.0 cc. of the solutions were injected without untoward effects.

Data obtained from this study led to the following conclusions:

1. When administered parenterally in this way, methantheline bromide effectively suppressed secretions of the salivary glands during dental procedures.

2. The onset time and the duration of the antisialogogic action of methantheline bromide were similar to those of the anesthesia produced by the local anesthetics.

3. The addition of methantheline bromide to the local anesthetic solution shortened the duration of anesthesia.

4. The depth of anesthesia was increased as shown by the higher proportion of Grade A anesthesia.

5. No appreciable increase in side effects was noted.

6. Satisfactory dryness of the mouth was produced in over 90 per cent of the patients.

Thus, the administration of methantheline bromide in a local anesthetic solution produces a useful level of salivary inhibition which renders most dental procedures easier, quicker, more effective and more comfortable. The combination may be used in most patients, although a few medical conditions occasionally contraindicate its use. Stability in aqueous solutions is limited.

450 Sutter Street

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*Associate in research, College of Physicians and Surgeons.

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Growth of Scientific Knowledge • Scientific knowledge grows like an organic tree, not as a compilation of collector's items. Facts, observations, discoveries, as items, are but the nutrients on which the tree of knowledge feeds, and not until they have been thoroughly absorbed and assimilated, have they truly enlarged the body of knowledge. *Paul Weiss. The Message of Science. Occasional papers from the Rockefeller Institute No. 1 (1959).*

The effect of early dental treatment of anhydrotic ectodermal dysplasia

Hushang Borjian, D.D.S., Corpus Christi, Texas*

All patients with anhydrotic ectodermal dysplasia have dental defects which may lead to serious consequences. The purpose of this paper is to show the need of early oral rehabilitation and to describe the procedures involved in the treatment of these dental defects. Adequate early treatment is necessary in order to provide more normal physical development through better nutrition, and better social and emotional adjustment by improving the appearance of the child.

REVIEW OF THE LITERATURE

Koszewski and Hubbard have offered the most concise definition of this condition when they say, "Hereditary ectodermal dysplasia presents a syndrome of incomplete development of the epidermis and its appendages. . . ." It has been pointed out that the disease involves not only skin and structures derived from ectoderm, but also organs of mesodermal and endodermal origin. The clinical aspects of individual cases vary depending on the extent of tissue involvement.[1]

This condition occurs far more frequently in males than in females.[2] Wechselmann[3] claims that this syndrome is transmitted as sex-linked-hereditary factor from clinically normal females to the male offspring of a family in the same manner as hemophilia. If this is true, there must be more than one type of hereditary transmission since females are affected in 4 to 20 per cent of cases.[4,5,2] This syndrome seems to occur in all races as has been reported by Everett and others.[6,5]

The patient who is affected by the anhydrotic type of ectodermal dysplasia can be identified by his prominent forehead, wide brows, saddle nose (depressed nasal root and bridge), rather thick and everted lips, satyr-like ears, soft skin and sparse hair.[4-6] The skin is soft, thin and dry with few or no functioning sweat glands evident.

The first outstanding characteristic of this disease is anhydrosis or hypohydrosis. For this reason these individuals are intolerant to heat and are incapacitated during hot weather. The skin also tends to be hypersensitive to irritants.[7] The second outstanding feature is anodontia or oligodontia.

There are other anomalies in connection with anhydrotic ectodermal dysplasia which have been described as symptomatic of this syndrome. The hair of the scalp, eyelashes and eyebrows is sparse. The scalp hair usually becomes short, fine and stiff after puberty. The beard is more frequently normal, and axillary

and pubic hair is either scanty or absent. Sebaceous gland secretion is either impaired or absent.[8,5] Clarke and McCance and others report that patients with this condition often have poorly developed or absent mammary glands.[9] The nails of patients vary: they may be normal, may show slow growth, may be dystrophic with scalelike, longitudinal furrows or they may be completely absent from some of the fingers.[10,5] One anhydrotic patient has been reported with six fingers on each hand.[10] Metson and Williams[11] mention atrophic rhinitis, chronic pharyngitis, laryngitis and the absence of smell and taste. Upshaw found the glands of the mucous membrane of the nose and throat to be deficient in secretory function, resulting in dysphagia, hoarseness and intermittent complete aphonia. These patients suffer frequent upper respiratory infections and some have malodorous secretions from the nose.[12-14,5] It has been mentioned also that the mouth is dry with a somewhat atrophic mucosa. The absence of tears and myopia have been reported by Bowen.[4] Adrenal and pituitary dysfunctions have been reported in occasional instances.[5] Koszewski and Hubbard claim that chronic anemia appears to be a significant feature in many instances.[1] The mentality of the patients varies from normal to inferior.[15,4,7] Some report that mentality is average at an early age although the child matures poorly so as to be inferior as he grows older.[8] Sexual development is often poor.[5,10]

Anodontia or oligodontia is extremely grave because of its effect on the nutrition and emotional stability of the individual. Missing teeth (oligodontia) or absence of teeth (anodontia) occur in both the deciduous and the permanent dentition. In the case of oligodontia, the teeth are slow to erupt and abnormal in appearance. They are often cone-shaped, fragile, milk-white and somewhat opaque, while some are darkly pigmented.[16,10,5,6,7] The erupted teeth, particularly the incisors, cuspids and bicuspids, are often widely separated.[5,12] The pulp and root canal of these teeth seem to be large, and the occurrence of carious lesions is high.[6] The alveolar processes may not develop because of the absence of teeth but the basal bone may develop normally.[17]

Histopathologic study of the epidermis of anhydrotic patients reveals it to be thinner than normal. The sweat glands are either completely absent or poorly and irregularly developed.[5,8] The hair follicles are scanty and rudimentary with a deficiency of pilosebaceous structures. The vascular beds are normal. The mucous membranes of the mouth and throat show hypoplastic changes. The underlying glands as well as the epithelium are affected.

There are some other syndromes which must be differentiated from anhydrotic ectodermal dysplasia. These are hydrotic ectodermal dysplasia, Werner's syndrome and progeria of the Hutchinson-Gilford type.[5]

REPORT OF CASE

A two and one-half year old male child of Mexican extraction was referred to the dental department of Driscoll Foundation Children's Hospital on January 2, 1959, because of apparent absence of teeth. The primary concern of the parents was that he was not playing well with the other children, because they would bite him and he was not able to bite in return. A history was given of frequent episodes of high fever, occasionally accompanied by convulsions. These attacks were associated with exposure to hot weather. He had always had crusted nares, sparse light hair and scanty eyebrows and eyelashes. His parents reported that he has never perspired or cried with tears. His growth and development had progressed within the limits of the normal and his mental development had seemed normal.

Fig. 1 • Full face view of patient at first visit

The family history was negative for any of the characteristic signs of ectodermal dysplasia. He has a ten-month old sister who appears normal; a paternal granduncle was an albino.

The physical examination revealed the hair to be very sparse and blond, the skin dry, the eyebrows and eyelashes scanty, both nipples rudimentary in appearance and the nose saddle shaped. The stomatological examination showed the oral epithelium to be normal in appearance, the lips everted and rather thick (Fig. 1) and the jaws small with knife edge alveolar ridges. There were only two protruded milk-white and cone-shaped maxillary central incisors. Roentgenographic examination of the mouth and head indicated the presence of four maxillary and two mandibular poorly formed anterior teeth (Fig. 2). The tongue appeared somewhat large whereas other structures of the face and neck were normal. The remainder of the examination was essentially negative.

The findings warranted a dental diagnosis of oligodontia as a symptom of anhydrotic ectodermal dysplasia. It was decided to construct prosthetic dental appliances to take the place of the missing natural dentition. This was necessary to correct the eversion of the lips, to improve the ability to masticate food, to allow normal development of the muscles of the face and of mastication and to improve the appearance of the child. This cosmetic improvement was important not only from an esthetic standpoint but from a psychological point of view as well; the child was the butt of the jokes of his playmates and a subject of shame for his parents. During the first attempt to make impressions for construction of the dentures the patient was apprehensive and in spite of premedication became highly emotional with an attendant elevation of temperature and convulsions, so that we were unable to complete the procedure. At the next appointment, light nitrous oxide-oxygen supplemented with trichloroethylene was administered. He tolerated the anesthetic very well and preliminary impressions were taken with the maxillary central incisors present. Approximately one week later the same anesthetic was again used and the final impressions were taken. It was necessary

Fig. 2 • Profile, open mouth view roentgenogram of head and neck

Fig. 3 • Left: Extraoral appearance of mouth region during first week after insertion of both upper and lower dentures. Center: Extraoral appearance of mouth region after two months of wearing the complete dentures. Right: Extraoral appearance of mouth region after six months' use of the dentures

to use this anesthetic a third time for a try-in of the dentures before processing. On the day the dentures were to be delivered, the patient refused to keep them in his mouth for more than a few minutes at a time. The mother was instructed in the method of placing only the maxillary denture and was told to replace it each time the child removed it. Within 24 hours the child was content to leave the upper denture in place. The upper denture was worn for one week and at that time the lower denture was inserted and the child tolerated it very well (Fig. 3, left). The occlusion was excellent and tissue adaptation was rapid. Within three weeks, the child completely mastered his dentures and was able to masticate a diet compatible with his age. He has become very attached to the dentures and cries when they are taken from him.

The eversion of the lips has been corrected and the profile improved (Fig. 1, 3, 4). The child's social behavior has improved considerably. His mother was instructed in maintaining good oral hygiene to prevent untimely decay of the erupted teeth. These appliances will be changed periodically with the growth and development of the jaws and the eruption of the six unerupted teeth.

Fig. 4 • Full face after six months' wearing of the dentures

SUMMARY

A case of anhydrotic ectodermal dysplasia with oligodontia has been reported. At the time of this report, nine months after starting dental treatment, the child is improved, cosmetically, physiologically and psychologically.

*Dental department, Driscoll Foundation Children's Hospital, Corpus Christi, Texas.

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Clinical evaluation of ultrasonic scaling

Clarence M. McCall, Jr., D.M.D., M.S., and*
Lucian Szmyd, D.M.D., M.S., Brooks Air Force Base, Texas*

A clinical evaluation of the ultrasonic scaling technic was carried out on 240 military subjects. The ultrasonic technic was found to be as effective as the conventional scaling method in the removal of calculus, while the conventional oral prophylaxis technic was superior to the ultrasonic method in the removal of stain. Most of the subjects preferred the ultrasonic method of oral prophylaxis over the conventional scaling technic. No statistical difference in tooth sensitivity or tissue trauma was noted between the two scaling technics.

Evaluation of the ultrasonic scaling technic as an adjunct in oral prophylaxis is a problem now confronting the dental profession. Several investigators have reported satisfactory results with the ultrasonic method. Zinner[1] found no adverse clinical symptoms in patients whose teeth were scaled with the ultrasonic instrument. He also noted a lower degree of root sensitivity and very little gingival hemorrhage. Johnson and Wilson[2] scaled the teeth of ten clinical patients with heavy calculus. They demonstrated that ultrasonic energy could successfully remove stain and calculus. Wilson[3] reported that patients expressed a preference for the ultrasonic method. He noted that the ultrasonic technic is not nearly so effective as the rubber polishing cup for removing stain. Mallernee[4] studied the effect of ultrasonic energy on the periodontal membrane, alveolar bone and gingivae of dogs. He observed no injury to these tissues.

Additional clinical and experimental research is necessary to supplement these preliminary reports before accepting the ultrasonic method for routine oral prophylaxis. The purpose of this investigation was to compare the clinical effec-

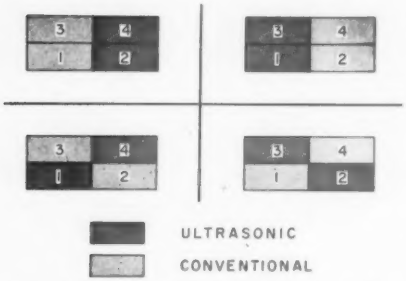

Fig. 1 • Scaling patterns used in this study

tiveness of the ultrasonic method of oral prophylaxis with the conventional scaling technic.

METHOD

Two hundred and forty male military personnel needing an oral prophylaxis were utilized in this investigation from the large number of patients at Randolph and Lackland Air Force Base dental clinics. Three groups of 80 patients having slight, moderate or severe calculus were selected for the study. These subjects were required to have a minimum of five teeth in each quadrant. Their ages ranged from 17 to 46 years with a mean age of 23.5 years.

To avoid the preference that graduate hygienists might show for one technic over the other, two dental technicians, untrained in oral hygiene procedures, were selected as operators. They were given an intensive four month course in ultrasonic and conventional scaling technics.

A predetermined scaling pattern was assigned to all subjects (Fig. 1). One upper and one lower quadrant were always scaled by the ultrasonic method. The quadrants to be scaled by each method were selected at random so that all the four possible patterns were used before one was repeated. Each quadrant was scaled for exactly ten minutes. Comparable instruments were selected for the two scaling technics (Fig. 2). The rubber polishing cup was used only with the conventional scaling method. Each operator performed 120 prophylaxes. This included ten subjects per pattern within each calculus group. The operator noted the number of teeth scaled by each technic. He also noted the presence or absence of crown and root sensitivity during scaling procedures.

The evaluation was designed to determine whether the ultrasonic scaling technic was equivalent to, better than, or not as effective as the conventional scaling method in regard to calculus and stain removal, tissue trauma and tooth sensitivity. The patient's preference for scaling method was also noted. The investigators compared the results of ultrasonic and conventional scaling in both the upper quadrants and the lower quadrants. Scaling patterns were unknown to the investigators at the time of the evaluation.

RESULTS AND DISCUSSION

A comparable number of teeth was scaled by both methods. The mean number of teeth scaled per mouth by operator A was 13.9 (range 11-16) by each

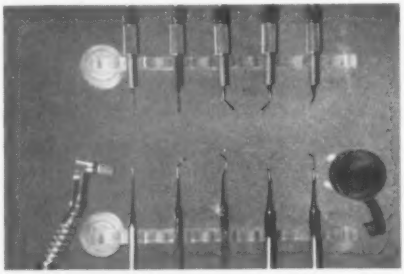

Fig. 2 • Conventional and ultrasonic instruments used in this study. Top row: Ultrasonic scalers—P-7, P-1, P4-R, P4-L, P-3. Bottom row: Conventional scalers—Zerfing scaler, Younger-Good no. 7, Younger-Good no. 8, Jaquette no. 2, Jaquette no. 3

Table 1 • Calculus removal by ultrasonic and conventional methods

Operator	Calculus removed better by		
	Ultrasonic	Conventional	No difference
A	26	34	180
B	67	23	150
Total	93	57	330

method. The mean number of teeth scaled by operator B was 14.3 (range 11-16) by each method.

An analysis of the data for calculus and stain removal is given in Tables 1 and 2.

The ultrasonic method gave the better result in 62 per cent of the 150 instances where the two methods differed in calculus removal. This 62 per cent was statistically different only at the 0.05 level from the 50 per cent hypothesized if there were no difference in the removal of calculus by the two methods.

The conventional method removed the stain better in 87 per cent of the 253 instances in which the stain removal differed. This percentage was significantly different ($P<.01$) from the 50 per cent expected for no difference in stain removal. A conservative appraisal of the findings indicates that the ultrasonic technic is as effective as the conventional scaling method in the removal of calculus while the conventional oral prophylaxis technic is superior to the ultrasonic method in the removal of stain. Examples of calculus and stain removal are shown in Figure 3.

The preference of the subjects for cleaning method is given in Table 3.

Eighty-two per cent of the subjects preferred the ultrasonic method, 10 per cent preferred the conventional method, and 8 per cent were undecided. The reason most often given for choosing the ultrasonic method was that it was more comfortable. Statements were also made to the effect that the ultrasonic method took less time, was easier, and made the teeth feel smoother. The objectionable feature most frequently mentioned by the subjects was the presence of an excess amount of water. The vibration and sound were also listed as objectionable.

A chi-square analysis of crown and root sensitivity revealed no statistical difference between the two oral prophylaxis methods (Tables 4 and 5). There was no residual tooth sensitivity present with either of the cleaning methods.

Tissue trauma was different on the two sides of the jaw only 5 per cent of the time. This difference in the sides of the 25 jaws, however, was not associated with either of the cleaning methods. The side with less trauma had been scaled by the conventional method in 11 instances and by the ultrasonic method in 14.

Some of the findings were associated with operator and method used. In the removal of calculus, operator A had a difference between sides in only 25 per cent of the jaws he scaled. In these, the better scaled side was distributed about

Table 2 • Stain removal by ultrasonic and conventional methods

Operator	Stain removed better by		
	Ultrasonic	Conventional	No difference
A	12	76	152
B	22	143	75
Total	34	219	227

Table 3 • Preference of subjects for cleaning method

Operator	Cleaning method preferred		
	Ultrasonic	Conventional	Undecided
A	99	17	4
B	98	6	16
Total	197	23	20

Table 4 • Crown sensitivity by ultrasonic and conventional methods

Operator	Method to which crown of teeth sensitive while being cleaned		
	Ultrasonic	Conventional	Not sensitive
A	37	20	423
B	7	9	464
Total	44	29	887
$\chi^2 = 2.33$, d.f. = 1			

Table 5 • Root sensitivity by ultrasonic and conventional methods

Operator	Method to which root of teeth sensitive while being cleaned		
	Ultrasonic	Conventional	Not sensitive
A	33	18	429
B	6	9	465
Total	39	27	894
$\chi^2 = 2.91$, d.f. = 1			

Table 6 • Calculus removal by ultrasonic and conventional methods according to degree of precleaning calculus

Precleaning calculus	Calculus removed better by		
	Ultrasonic	Conventional	No difference
Slight	21	16	123
Moderate	35	21	104
Severe	37	20	103
Total	93	57	330
$\chi^2 = 7.95$, d.f. = 4			

Table 7 • Stain removal by ultrasonic and conventional methods according to degree of precleaning calculus

Precleaning calculus	Stain removed better by		
	Ultrasonic	Conventional	No difference
Slight	10	69	81
Moderate	14	74	72
Severe	10	76	74
Total	34	219	227
$\chi^2 = 1.89$, d.f. = 4			

Table 8 • Calculus removal by ultrasonic and conventional methods according to scaling pattern

Scaling pattern	Calculus removed better by		
	Ultrasonic	Conventional	No difference
1	23	16	81
2	25	15	80
3	19	18	83
4	26	8	86
Total	93	57	330
$\chi^2 = 5.50$, d.f. = 6			

Table 9 • Stain removal by ultrasonic and conventional methods according to scaling pattern

Scaling pattern	Stain removed better by		
	Ultrasonic	Conventional	No difference
1	12	52	56
2	12	51	57
3	4	64	52
4	6	52	62
Total	34	219	227
$\chi^2 = 8.99$, d.f. = 6			

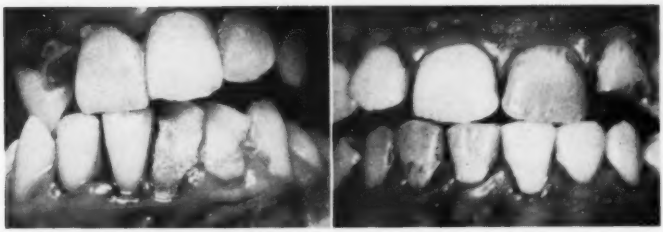

Fig. 3 • Left: View after ultrasonic scaling of lower right quadrant of mouth. Right: Comparison of stain removal using basic fuchsin indicator. Conventional technic with rubber polishing cup was used on upper right and lower left quadrants of mouth; ultrasonic technic was used on upper left and lower right quadrants

equally between the two methods. Operator B had differences in 37.5 per cent of the jaws he scaled with 74 per cent of the better scaled sides done with the ultrasonic method. In stain removal, operator A had differences between sides in 37 per cent of the jaws he scaled, but operator B had differences in 68 per cent. However, both operators had better results with the conventional method in 86 per cent of the jaws that differed. In comparing the subjects' reactions, a statistically larger number of operator A's group reported sensitivity in the teeth during ultrasonic procedures.

The data were also examined to see if the degree of pre-existing calculus or the scaling pattern used could have an effect on the result of the two scaling technics for calculus and stain removal (Tables 6-9). A chi-square analysis showed that the degree of calculus present prior to the prophylaxis and the scaling pattern used were not factors in the evaluation.

SUMMARY AND CONCLUSIONS

A clinical evaluation of the ultrasonic scaling technic was carried out on 240 military subjects. Equivalent experimental situations were formulated for the ultrasonic and conventional oral prophylaxis technics by incorporating the following features into the experimental design: (1) the use of operators having equal training in both scaling technics; (2) the selection of three equal groups of subjects having slight, moderate, or severe calculus; (3) the selection of subjects possessing a minimum of five teeth in each quadrant; (4) the use of predetermined scaling patterns for all subjects, and (5) the selection of conventional scaling instruments to match as closely as possible the ultrasonic scaling tips.

The following observations are based on the results obtained by the two technics:

1. The ultrasonic technic is as effective as the conventional scaling method in the removal of calculus.
2. The conventional oral prophylaxis technic is superior to the ultrasonic method in the removal of stain.
3. Most of the subjects preferred the ultrasonic method of oral prophylaxis over the conventional scaling technic.
4. There was no statistical difference in crown and root sensitivity between the two scaling technics.
5. No residual tooth sensitivity was present with either oral prophylaxis technic.
6. No statistical difference in tissue trauma after scaling procedures was noted.
7. Operator differences existed in this study.

8. The conventional rubber polishing cup should be used in place of the ultrasonic scaling tips for polishing the teeth.

9. Areas for improvement of the Cavitron instrument should involve the following: (1) cumbrousness of waterline-handpiece combination; (2) "excess water", complained of by the patients, and (3) inability to polish tooth surfaces rapidly.

10. Further clinical trials are needed to perform time studies and to evaluate problems of maintenance, operator acceptance, and standardization of ultrasonic tips.

The Cavitron portable prophylaxis unit, Model 30, manufactured by the Cavitron Equipment Corporation, was used in this investigation.

This study is from the research dentistry division, School of Aviation Medicine, U. S. Air Force, Randolph Air Force Base, Texas.

*Major, Dental Corps, U. S. Air Force. Formerly, School of Aviation Medicine, Randolph Air Force Base; at present, department of dental sciences, School of Aviation Medicine, USAF Aerospace Medical Center, Brooks Air Force Base, Texas.

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World Population Growth • Although the first complete census of mankind has yet to be taken, it is possible to reconstruct, with reasonable accuracy, the history of world population growth. This history may be encapsulated in the following estimates of the population of the earth: at the end of the Neolithic period in Europe (8000 to 7000 B.C.) (1), 10 million; at the beginning of the Christian era, 200 to 300 million; at the beginning of the modern era (1650), 500 million; in 1950, 2.5 billion. . . .

The present population of the world could be produced from an initial population of two dozen individuals increasing at the rate of 0.02 per cent per year over a period of 100,000 years, and man has been on the earth for at least 200,000 to 1 million years.

The rate of population growth has increased enormously over the three centuries of the modern era (1650-1950), during which time it averaged about 0.5 per cent per year. Over this period the rate of growth increased from about 0.3 per cent per year between 1650 and 1750 to 0.9 per cent per year between 1900 and 1950. World population growth averaged 1 per cent per year between 1930 and 1940.

Now, a 1-per cent return per year, even compounded, would by our standards represent a meager return on investment. But it constitutes a fantastically rapid rate of population increase. One hundred persons multiplying at 1 per cent per year, not over the period of 200,000 to 1 million years of man's occupancy of this globe but merely for the 5000 years of human history, would have produced a contemporary population of 2.7 billion persons per square foot of land surface of the earth! *Philip M. Hauser. Demographic Dimensions of World Politics. Science 131:1641 June 3, 1960.*

Distribution of fluorine in teeth and alveolar bone

S. H. Yoon, D.D.S., M.S.; F. Brudevold,* D.D.S., M.S., Boston; F. A. Smith,† Ph.D.; D. E. Gardner,† B.S., Rochester, N. Y., and N. Soni,* D.D.S., M.S., Boston*

A study was made of the deposition of fluorine in layers of human jaw bone and of adjacent teeth from 11 cadavers. The greatest concentration of fluorine was found in pulpal dentin, and then, in descending degrees of concentration, in cementum, subperiosteal bone, spongy bone, lamina dura, root apex, enamel surface and the middle portion of root dentin. The lowest concentration of fluorine was found in the bulk portion of the enamel. The pattern of distribution of fluorine in alveolar bone and teeth was similar to that of Ca^{45} and P^{32}.

The deposition of fluorine varies, not only in different skeleton components,[1-10] but in different regions of individual bones,[2,11-14] In long bones, concentrations are greater in epiphysis than in diaphysis,[2,11-14] and greater in the periosteal and endosteal portions of the shaft than in the intermediate portion of the cortex.[14] These differences in the distribution of fluorine have been attributed to variations in vascularity, rate of growth, and remodeling in different portions of the bones. In view of these findings a study of the deposition of fluorine in different portions of alveolar bone was undertaken. The concentrations of fluorine in layer samples of the subperiosteal plate, the intermediate portion, the lamina dura and of the teeth in the jaws were studied, and the fluorine levels in the gingival, intermediate, and apical portions of alveolar bone and in successive layers of contiguous teeth were compared.

MATERIAL AND METHODS

Jaw bones with teeth *in situ* were obtained from 11 cadavers which had been prepared for anatomical dissection. A fresh dog mandible was included to check the possibility that embalming of the human material might have altered the distribution of fluorine. After removal of the soft tissues, the teeth were extracted and the specimens were divided into two groups. Table 1 lists the bones, the number of teeth, the age and weight of different samples included in Group A. From each specimen layer, samples, representing the external compact bone, the intermediary cancellous bone, and the lamina dura were ground or chiseled. Two pooled layers ground from the roots of the teeth of each jaw were also included. Additional layers representing

Table 1 • Age of bones and teeth in Group A and dry weight (milligrams) of layer samples

Specimen no.	Age (yrs.)	Type of bone	No. of teeth	Bone			Root	
				Compact	Cancellous	Lamina dura	1st layer	2nd layer
1	70	maxilla	4	89	285	175	113	125
		mandible	3	145	362	73	65	96
2	75	maxilla	3	122	413	89	153	216
		mandible	6	200	148	157	210	167
3	77	mandible (right side)	5	—	668	75	328	307
		mandible (left side)	4	323	—	—	237	210
4	85	mandible (right side)	4	—	—	—	69	234
		mandible (left side)	4	—	—	20	38	185
5	90	maxilla	9	227	422	106	360	361
		mandible	2	250	369	147	132	116
Dog	4	mandible	10	172	—	56	216	149

Table 2 • Age and dry weight (milligrams) of bone samples in Group B

Specimen no.	Age (yrs.)	Type of bone	Gingival third	Middle third	Apical third
1	64	mandible	64	134	125
2	66	maxilla	112	144	170
3	76	mandible	159	134	178
4	77	mandible	87	132	247
5	89	mandible	137	194	102
6	unknown	mandible	107	140	205

surface and subsurface enamel and various portions of crown and root dentin were ground from the teeth of specimen 5. From Group B samples of alveolar bone, representing the gingival, intermediate, and apical portions were prepared. The age and weight of these samples are given in Table 2. The teeth in Group B were pooled as shown in Table 3. Layer samples having dry weights as listed in Table 3 were prepared from the pooled enamel and the roots.

The samples were ashed in platinum dishes at 575°C. and weighed. The fluoride was separated by the distillation method of Willard and Winter.[15] The fluoride in the distillate was determined by the titration method of Smith and Gardner.[16]

RESULTS

The findings obtained on all the samples in Group A and on the bone samples in Group B are given in Table 4. With the exception of one specimen, the subperiosteal compact bone had greater concentrations of fluorine than either the lamina dura or the intermediate bone in those instances where all three types of bone were analyzed. The alveolar bone of the dog also showed a higher level of fluorine than the lamina dura. However, as indi-

cated by the mean values of the compact bone and the lamina dura, 1,526 ppm and 1,322 ppm respectively, the differences in concentrations were not of great magnitude.

In the human specimens there was considerably more fluorine in the first layer of the dental root than in any portion of the alveolar bone. There was a pronounced decrease in concentration in the second as compared to the first layer of the roots. In the dog, the level of fluorine was about the same in the alveolar bone and the cemental layer of the root, but here also the cementum contained greater concentrations than the lamina dura.

The fluorine concentrations of various portions of alveolar bone and of teeth from specimen 5 in Group A are given diagrammatically in the illustration. The greatest concentration of fluorine occurred in the surface layer of pulpal dentin (2,711 ppm), then, in descending degrees of concentration, in the surface layer of cementum (2,390 ppm), the external layer of compact bone (1,490 ppm), cancellous bone (1,205 ppm), lamina dura (1,165 ppm), the apical portion of the teeth (1,084 ppm), and the surface layer of enamel (584 ppm). The lowest concentration of fluorine was found in the bulk portion of the enamel (62 ppm).

Table 4 shows that there is little difference in the concentrations of fluorine in the gingival, intermediate and apical portions of alveolar bone. In four specimens the greatest concentrations occurred in the gingival portion, and in the remaining two in the intermediate portions.

There was considerable difference in the level of fluorine in the bone and tooth specimens of the different individuals. However, since the history and fluorine ingestion of the persons are unknown, these differences cannot be correlated with age, or otherwise interpreted.

Table 5 gives the concentration of fluorine in three successive layers of enamel and in two layers from the root of the teeth from the jaw specimens in Group B. It should be noted that the concentration of fluorine in cementum is approximately three times greater than that in external enamel. From Tables 4 and 5 it appears that the level of fluorine in cementum is from two to four times greater than that of the contiguous alveolar bone.

Table 3 • Dry weight (milligrams) in successive layers of enamel and root samples of teeth in Group B

Specimen no.	No. of teeth	Enamel layer			Root layer	
		1	2	3	1	2
1	11	107	59	142	106	90
3	13	71	51	109	69	52
2 & 6	16	74	67	74	67	71
4 & 5	41	70	72	104	94	80

DISCUSSION

Perhaps the most notable finding in the present study was the greater concentration of fluorine in the cementum than in the lamina dura and the other portions of the alveolar bone. Since both the lamina dura and the cementum face the periodontal membrane and since they are fairly similar in structure, the same level of fluorine might have been expected. Sognnaes and others,[17] observed greater uptake of P^{32} by the cementum than by lamina dura. Radioactive iodine also has been shown to penetrate more readily into cementum than into lamina dura, dentin, and enamel.[18] Evidently, cementum is more permeable than the lamina dura, and it may possess a greater reactive surface than the neighboring bone.

Aside from the differences in structure, the metabolism of the lamina dura and the cementum must be different. For example, the process of remodeling may be particularly pronounced in lamina dura because of the resorption and apposition associated with the functional

Table 4 • Fluorine concentrations (ppm ash weight) of bone and root samples in Group A and of bone samples in Group B

Group A

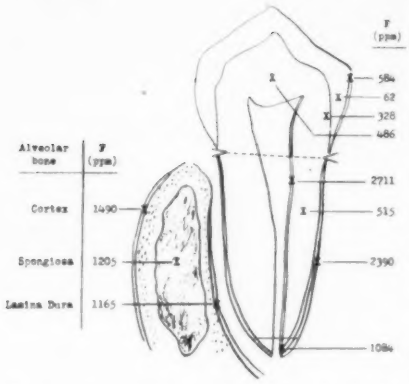
Specimen no.	Type of bone	Bone			Root	
		Compact	Cancellous	Lamina dura	1st layer	2nd layer
1	maxilla	1170	1540	1435	2220	1545
	mandible	1292	1151	1245	2640	1907
2	maxilla	1870	1317	1642	2040	607
	mandible	1810	1162	1491	2290	1222
3	mandible (right side)	—	1850	—	1710	659
	mandible (left side)	1110	—	—	1892	1947
4	mandible (right side)	—	—	—	2980	1985
	mandible (left side)	—	—	2110	3330	1945
5	maxilla	1532	—	1038	2390	1920
	mandible	1490	1205	1165	1950	1040
Dog	mandible	1517	—	1238	1500	843

Group B

Specimen no.	Type of bone	Gingival third	Middle third	Apical third
1	mandible	761	875	743
2	maxilla	1500	1607	1427
3	mandible	1720	1508	1638
4	mandible	1413	1168	1140
5	mandible	2090	1550	1608
6	mandible	943	808	639

stress and movement of the teeth. In contrast, the cementum remains relatively static throughout life except for slight appositional growth. Because of remodeling, the mineral in alveolar bone may be subjected to a shorter period of fluorine exposure than that of cementum. Fluorine released during resorption of bone may be acquired by the cementum.

In a consideration of the over-all distribution of fluorine in teeth and alveolar bone as seen in the illustration, the question arises as to whether this pattern of deposition is specific for fluorine or whether it applies to other elements. Several radioactive studies in which P^{32} or Ca^{45} were employed have shown greater deposition in dentin than in enamel.[19-22] The early work of Hevesy and co-workers showed that the uptake of P^{32} was greater in the dentin immediately surrounding the pulp, and that it was higher in the root than in the crown dentin. In general, the rate of P^{32} uptake was inversely proportional to the density of the tooth structure. Volker and Sognnaes[23] also showed that the deposition of P^{32} was greater in root than in crown dentin and eight-fold greater concentrations of P^{32} were found in dentin than in enamel. A study by Sognnaes, and others[17] showed that the highest P^{32} activity in cortical bone was at the surface adjacent to the periosteum. In teeth the highest activity



Fluorine concentrations of portions of alveolar bone and teeth

was in cementum and, in descending degrees of activity, the pulpal surface of dentin, surface enamel, the dentin adjacent to the dentinoenamel junction, and the middle portion of enamel.

The similarity between the deposition of fluorine and of P^{32} and Ca^{45} is indeed impressive. This may seem surprising since there is no similarity between the deposition of fluorine and nonradioactive calcium and phosphorus in calcified structures. However, there is reason to believe that the reaction between the apatite crystals and the isotopes of calcium, phosphorus and fluorine follows a similar pattern.[24] In the first and second phases, there is a rapid diffusion of the isotopes into the hydration shell of the crystal and an exchange reaction at the crystal surface. In the third phase, isotopes penetrate into the crystal and assume positions in the interior lattice. However, the rate of the third phase is very slow compared to that of the preceding phases. The pattern of distribution in teeth and bone which was found for fluorine in the present study is, therefore, likely to be related to the accessibility and the surface area of the crystals in the different tissues. If the crystals are densely packed or covered by organic material, the rate of acquisition would be as low as in the case with the principal portion of the enamel and crown dentin. Judging from the uptake of fluorine by dental structures, cementum and dentin appear to provide a greater accessible surface area than enamel.

Gas adsorption measurements of powdered materials have shown that surface areas of enamel and dentin increase as the size of the particles are decreased,[25, 26] whereas the surface area of bone remains unchanged under these conditions.[25] Evidently the internal surfaces are only partly accessible in enamel and dentin and readily accessible in bone. The pronounced surface accumulation of fluorine in enamel and dentin and the more diffuse distribution in bone is very likely related to these differences in accessibility of the enamel.

The surface area of bone is much greater than that of dental tissues with values ranging from 65 to 244 square meters per gram, compared with about 3 square meters per gram for dentin and 1 square meter per gram for enamel. The reason that bone with its large surface area did not acquire greater concentrations of fluoride than dental surface structures may be attributable to the aforementioned process of bone remodeling. In addition, ions competing with fluoride for surface positions on the apatite crystals, such as bicarbonate and citrate are known to be more abundant in bone than in dental structures.

Table 5 • Fluorine concentrations (ppm ash weight) in successive layers of enamel and root samples of teeth in Group B

Specimen no.	Enamel layer			Root layer	
	1	2	3	1	2
1	454	303	113	3,130	3,030
3	1,253	690	295	4,660	4,580
2 & 6	1,230	600	311	3,230	3,510
4 & 5	1,110	360	284	3,360	3,630

SUMMARY

1. Fluorine concentrations were determined in layers of human jaw bone and of adjacent teeth from 11 cadavers and one dog.

2. The subperiosteal portion of the alveolar bone contains slightly higher concentrations of fluorine than the cancellous bone and lamina dura.

3. Fluorine concentrations in the gingival, middle, and apical portions of the alveolar bone varied, and there was no consistent pattern of distribution.

4. Greater concentrations of fluorine were always found in cementum than in lamina dura and other portions of the alveolar bone.

5. The greatest concentration of fluorine was found in pulpal dentin and, in descending degrees, in cementum, subperiosteal bone, spongy bone, lamina dura, root apex, enamel surface, and the middle portion of root dentin. The lowest concentration of fluorine was found in the bulk portion of the enamel.

6. The pattern of distribution of fluorine in alveolar bone and teeth was similar to that of Ca^{45} and P^{32} as reported by others.

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*Forsyth Dental Infirmary and Harvard School of Dental Medicine.

†University of Rochester.

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Noise from high-speed dental handpieces

Kenneth R. Cantwell, D.M.D., Archie R. Tunturi,† M.D., Ph.D., and Vernon R. Manny,‡ D.M.D., Portland, Ore.*

Concern has been expressed that noise from high-speed dental handpieces may attain levels high enough to produce hearing loss among patients or dentists. Noise level measurements were made on the Ritter R-Borden Airotor and the Page-Chayes instruments, when operated free-running and when used to cut an extracted tooth. Neither patients nor dentists can expect loss of hearing as a result of the noise levels of either type of instrument.

There has been some concern that noise from high-speed dental handpieces may attain levels high enough to produce hearing loss among patients or dentists. No data have appeared in the literature on the noise levels produced by these instruments either in the audible range or at supersonic levels. The noise which is of concern in this report is the airborne audible noise arising from the instrument itself and reaching the ear by way of the air around the head. No attempt has been made to evaluate the noise produced in the tissues and its effect on the tissues, or the transmission of noise through the tissues to the ear.

METHODS

The noise level measurements were made only on two makes of instruments, the Ritter R-Borden Airotor and the Page-Chayes, since a sufficient number of each was available to permit a statistical estimate of the noise levels to be expected. The measurements were taken in a small dental operating room of the University of Oregon Dental School. The room was irregular in shape with one semi-curved wall and two flat walls. The ceiling was covered with Fiberglas, sound absorbing material. The ambient background noise levels (Fig. 1) were sufficiently low to present no interference with the measurements. All noise level measurements were made with a General Radio type 1551-A sound level meter and a General Radio type 1550-A octave band noise analyzer. The microphone was maintained at a distance of 8 inches from the instruments tested. The noise levels were measured in octave bands between 20 and 9,600 cycles per second. The octave band levels are expressed in decibels (db) above the standard reference level of 0.0002 microbars.

RESULTS

Noise levels in octave bands of 11 Ritter R-Borden Airotors (one used, ten new) were measured using the model A panel with an air pressure of 36 pounds per square inch.

Figures 2 and 3 show the octave band noise levels with this instrument free-running, without and with a no. 701 cross-cut fissure bur. In both instances

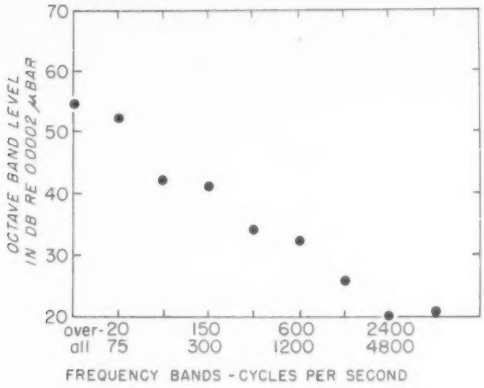

Fig. 1 • Background noise level in office, C-scale

below 1,200 cycles per second, the levels were approximately 50 db or less. Above this frequency, the octave band levels increased rapidly to reach an average of approximately 83 db in the band from 4,800 to 9,600 cycles per second without a bur, and approximately 80 db with a bur. The slight decrease was possibly due to loading of the instrument. In both instances, at the higher octave band levels above 1,200 cycles per second, the range was approximately 15 to 20 db for the 11 instruments. Most of this variation was due to differences in the instruments. One could almost recognize each instrument by listening to its noise. Moving the instrument in the vicinity of the measuring position did not change the level reading appreciably.

The noise levels were also measured

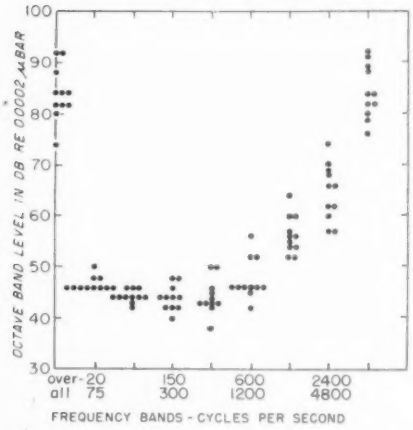

Fig. 2 • R-Borden Airotor handpieces (1 used, 10 new), model A panel, air pressure: 36 psi, without bur

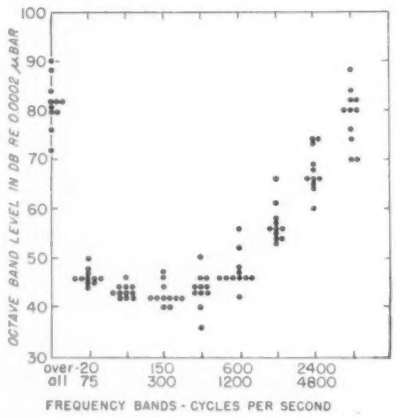

Fig. 3 • R-Borden Airotor handpieces (1 used, 10 new), model A panel, air pressure: 36 psi, with bur (701 crosscut fissure)

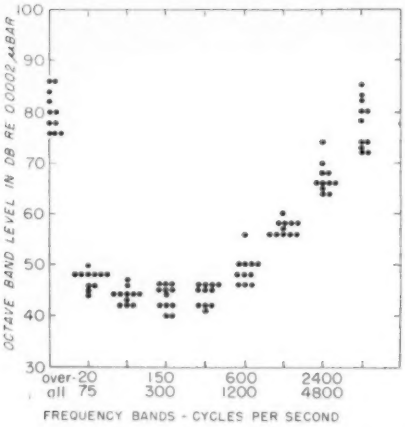

Fig. 4 • R-Borden Airotor handpieces (1 used, 10 new), model A panel, air pressure: 36 psi, with bur (701 crosscut fissure). Cutting extracted tooth with air as coolant

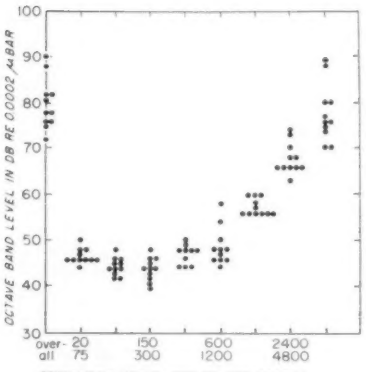

Fig. 5 • R-Borden Airotor handpieces (1 used, 10 new), model A panel, air pressure: 36 psi, with bur (701 crosscut fissure). Cutting extracted tooth with air and water as coolant

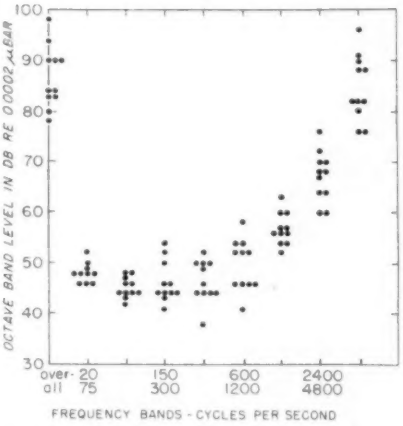

Fig. 6 • R-Borden Airotor handpieces (1 used, 10 new), model B panel, air pressure: 28 psi, without bur

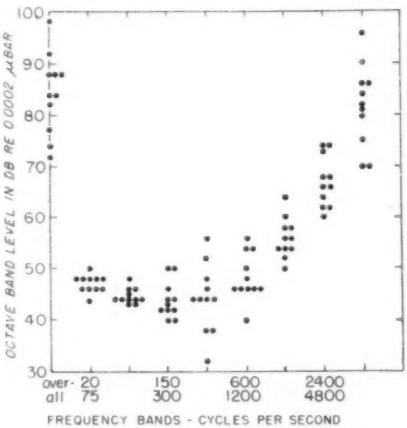

Fig. 7 • R-Borden Airotor handpieces (1 used, 10 new), model B panel, air pressure: 28 psi, with bur (701 crosscut fissure)

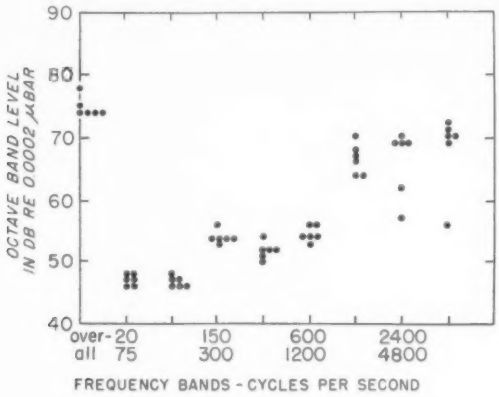

Fig. 8 • Page-Chayes used handpieces, without bur

while an extracted tooth was cut with air as a coolant, and with air and water as a coolant, using the model A panel (Fig. 4, 5). In both instances the average level for the octave band 4,800 to 9,600 cycles per second was approximately 80 db, which was about the same value obtained with the free-running bur. Otherwise, the measurements were similar to those of the free-running instrument. There was a slight decrease in the range of variation. This may be due to the loading of the instrument.

A second set of measurements was taken with the Ritter R-Borden Airotors, using a new model B panel which provided an air pressure of 28 pounds per square inch to the handpiece. Two sets of measurements were taken, without and with a bur (Fig. 6, 7). The average level between 4,800 and 9,600 cycles per second was approximately 84 db in both

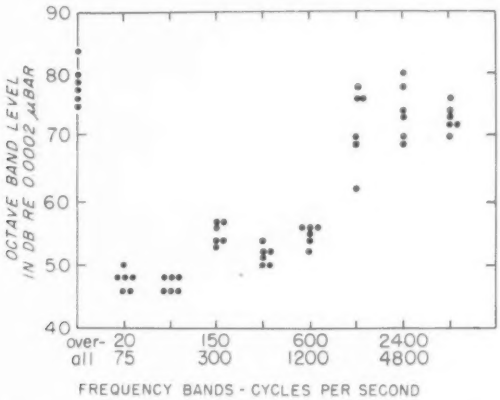

Fig. 9 • Page-Chayes used handpieces, with bur (701 cross-cut fissure)

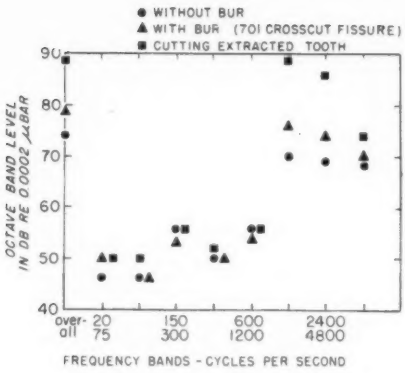

Fig. 10 • Page-Chayes T6412 used handpiece

instances and the variability was about the same as that observed with the model A panel at 36 pounds per square inch. There was a slight decrease in average noise level above 2,400 cycles per second when using the bur. This may be due to loading of the instrument. One particular instrument showed a level of 95 db between 4,800 and 9,600 cycles per second either with or without a bur.

Octave band noise levels were measured for six Page-Chayes handpieces without and with a bur (Fig. 8, 9). Without a bur the noise levels below 1,200 cycles per second were between 46 and 57 db with the highest levels occurring between 150 and 1,200 cycles per second. Above 1,200 cycles per second the spectrum was relatively flat with the highest level of 73 db occurring between 4,800 and 9,600 cycles per second. With the introduction of the bur (Fig. 9), there was an increase in noise level above 1,200 cycles per second with the maximum of 80 db occurring between 2,400 and 4,800 cycles per second.

The octave band levels of a single Page-Chayes instrument were compared for three conditions: without bur, with bur, and cutting extracted tooth (Fig. 10). The octave band levels below 1,200 cycles per second were all under 56 db. Above this frequency the noise levels were dependent on the condition imposed. The lowest levels encountered were without bur and did not exceed 72 db. With the bur there was an increase of approximately 5 db. While extracted tooth structure was cut a maximum level of 89 db in the octave band between 1,200 and 2,400 cycles per second was measured. The spectrum above 1,200 cycles per second was flat for the free-running instrument. The increase in noise level was due primarily to cutting tooth structure.

Table • Results of measurements taken with Ritter R-Borden Airotor

Technic	Over-all level	Octave-band pressure levels Re. .0002μ bar							
		20–75	75–150	150–300	300–600	600–1,200	1,200–2,400	2,400–4,800	Above 4,800
1. Outside mouth	74–75	52	53	56	58	68	70	74	67
2. Free running in mouth, not touching	74–75	52	54	56	59	70	70	73	66
3. Cutting silver amalgam*	75–79	52	54	56	58	68	70	73	68
4. Cutting silver amalgam*	74–78	52	54	56	58	68	69	74	68
5. Cutting tooth structure*	74–76	54	50–58	52–60	54–60	62–68	64–66	68–70	72
6. Cutting amalgam and tooth structure*	74–76	54	70	56–60	60	68–70	68	70	70

*Measurements made while cutting procedures were being made in the mouth.

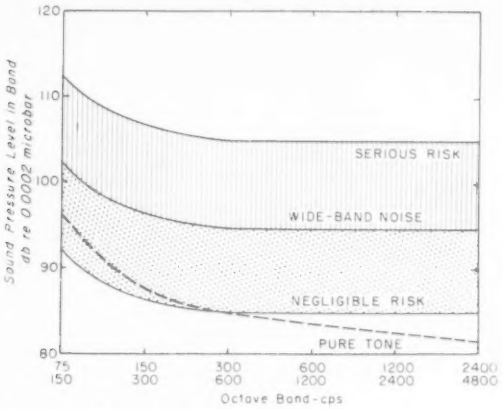

Fig. 11 • Tentative damage-risk chart. Hearing loss serious enough to affect significantly the ability to understand speech. Courtesy of General Radio Corporation from the "Handbook of Noise Measurement and Measurement of Vibration," 3 ed.

The possibility of noise reduction as a result of operating the instrument in the oral cavity was tested. The noise levels were recorded on magnetic tape using an Ampex 601 recorder, and subsequently analyzed with the octave band analyzer. The measurements were taken using the Ritter R-Borden Airotor with a free-running bur outside of the mouth and within the mouth. The results are shown in the table. No differences could be observed when cutting inside or outside of the mouth. Also, the noise levels were measured while silver amalgam and tooth structure were cut in the mouth. These measurements showed no obvious differences in noise levels (see table).

DISCUSSION AND CONCLUSIONS

The possibility of damage to hearing due to noise levels encountered with the instruments mentioned in this report must be considered in the light of the tentative hearing loss standards set up by the Air Force. Figure 11 shows the pure tone and wide band hearing loss criterion curves. If a person is exposed eight hours a day for a lifetime to a pure tone or noise level above the two curves indicated, there is a risk to his hearing. There is no way at the present time to determine which individuals will lose their hearing.

Approximately one half or less of the Ritter R-Borden Airotors tested produced noise levels above 84 db in the range between 4,800 and 9,600 cycles per second, when operated free-running. When an extracted tooth was cut, the noise levels were generally reduced. However, in no case did the average exceed 84 db. The variability was characteristic of these instruments and could be verified simply by listening to the instruments.

In contrast, the noise levels of the Page-Chayes instruments were less annoying and were well below the levels generally considered harmful to hearing when free-running. The maximum levels encountered with the Page-Chayes were approximately 70 to 75 db and the spectrum was flatter in character. Much of the noise caused by the Page-Chayes was

due to the belt system rather than to the rotor. With the Ritter instruments, the noise was entirely due to the rotor. When the Page-Chayes was used to cut extracted tooth, a high, relatively wide, band noise was produced.

Loading the Page-Chayes does not necessarily reduce its cutting, since more power can be delivered from the multiple-belt-drive system. Thus, both the Airotor and the Page-Chayes handpieces produce about the same noise levels but under different operating conditions. The noise made while cutting with the Page-Chayes handpiece merits more study.

There were no observable differences in sound-pressure levels when the instruments were used within or outside of the oral cavity.

Since the minimum risk levels are based on an eight hour per day exposure for a lifetime it can be concluded that neither patients nor dentists could expect loss of hearing as a result of the noise levels of either type of instrument mentioned in this report. Temporary threshold shifts may occur but these cannot be considered as constituting a hazard to hearing.

This study relates only to the two instruments mentioned herein and is not intended to portray the characteristics of all air-turbines.

This investigation was supported by a research grant (D-914) from the U. S. Public Health Service.

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*Head, department of operative dentistry, University of Oregon Dental School.

†Consultant in architectural acoustics and noise control, University of Oregon Medical School.

‡Clinical associate, University of Oregon Dental School.

Genetics and Biochemistry • Modern research has thrown new light upon the age-old dispute over the relative importance of inheritance versus environment, of instinct versus learning. Every living organism, including man, has a genetic constitution which establishes and limits the potential for growth, differentiation and life span. Every manifestation of structure, function or behavior is determined by the interaction of the organism with its environment and becomes an essential element in each phase of growth, development and aging. These dramatic developments along with the new understanding of mutations which may be brought about by radiation have awakened a great interest in genetics, a discipline which will have a profound impact upon the whole field of reproduction, congenital anomalies, chemical as well as anatomical, and a wide range of clinical manifestations. The discovery that many diseases may be due to the genetically determined absence or reduction in amount of a single enzyme adds great importance to some new concepts of growth, physiology, infection and disease. The advances in biochemistry, in tissue culture, in electrophoresis and paper chromatography, combined with a knowledge of the principles of genetics, offer special opportunities not only for diagnosis and prevention but also for treatment. . . . Many diseases are in reality combinations of constitutional and environmental factors. Sometimes too much emphasis has been placed on the trigger mechanism of the environment and too little on the factors of inheritance and susceptibility. An understanding of certain disturbances in the human being is now possible through the application of recently acquired knowledge of enzymatic and biochemical processes. *W. C. Rappleye. Science—Man's Master or Servant, 1959.*

Clinical observations of number of fractures of acrylic and modified copolymer vinyl dentures

William F. D. Grant, D.D.S., Detroit*

Six hundred and ninety-five dentures with bases and teeth made of vinyl resin were compared as to incidence of fracture with an equal number of acrylic dentures with porcelain teeth. Length of service—five years—was equal for the two groups of dentures. As a check against the clinical study, an additional 760 patients (431 with vinyl dentures and 329 with acrylic dentures) were queried by mail and responded. The acrylic resin dentures with porcelain teeth were fractured nine times more frequently than the vinyl resin dentures with vinyl resin teeth.

Synthetic resins have been used in the construction of prosthetic dental appliances for several years since they possess a number of advantages over previously utilized compounds such as vulcanite or metal. The three plastics commonly used as denture bases are acrylic, vinyl and styrene resins. All have varying degrees of toughness, flexural and tensile strength, permanency, low cold flow, high resistance to water and solvents, minimal dimensional change, high relative hardness, moldability and adaptability to a simple technic. Comparative evaluation of the foregoing characteristics of these materials has been the subject of other investigations in the past and is not within the scope of this paper.

Both acrylic and vinyl resin products have been used extensively in the dental division of Henry Ford Hospital. Approximately 10,000 complete dentures have been constructed with an acrylic resin base and porcelain teeth. In excess of 6,500 all Luxene complete dentures have been constructed since 1952. (Luxene is a modified vinyl copolymer containing an acrylic plasticizer.) Because of the relatively large number of dentures involved, and because the patients involved are typical of those cared for in private practice, it was thought that it would be of interest to compare the acrylic and vinyl resin products from the standpoint of clinical wear, especially in regard to fracture of base material and teeth.

Strength and breakage have been checked previously in the research laboratory, but this, of course, cannot duplicate typical clinical wear and its attendant complications. It was thought, therefore, that study and evaluation of a large group of dentures made in typical private practice might contribute considerably to the knowledge of the performance of these widely used materials. It was with this in mind that the following study was undertaken.

OBSERVATIONS

One thousand three hundred and ninety dentures were selected at random for study, 695 of these were all Luxene dentures and 695 were acrylic dentures with porcelain teeth. In each instance the length of service was equal.

No accurate figures separating upper and lower dentures were available since in some instances the only record was the notation to the effect that the denture had fractured and was repaired. However, in most instances an accurate description was available and the general impression was that the number of upper and lower dentures that were fractured and repaired were approximately the same.

The only additional stipulations followed in the selection were (1) to use only those dentures that had had a comparable length of service so that the figures on breakage could be evaluated accurately and (2) to use those in which an adequate follow-up was available. Five years was selected as an adequate period for observation.

Study of records of these dentures reveals that fractures requiring repair occurred nine times as frequently in the dentures constructed of the acrylic resin base material with porcelain teeth as in those constructed of all Luxene base material and teeth. The figures accumulated in the study were 100 repairs in the 695 dentures (14.4 per cent) over a five-year period of service in the acrylic group and 11 repairs in 695 dentures (1.6 per cent) over the same period of time in the vinyl resin group. Since these figures were obtained directly from the patient's records they could not reflect the number of repairs that were done elsewhere. To compensate for this possible inaccuracy, 1,000 additional patients in each group were contacted by mail to obtain their record of denture repairs. Seven hundred and sixty patients replied to the questionnaire (431 in the vinyl resin group and 329 in the acrylic resin group). It is of interest to note that the ratio was almost identical in the mail returns since reports from this group indicated that breakage was 8.5 to 1 more frequent in the acrylic resin dentures than it was in those with the vinyl resin base material and teeth. Seven patients with acrylic resin dentures reported several repairs which they did not number. Therefore these repairs could not be added to the total so that it is known that the number is greater than reported.

COMMENT

When tooth fracture and denture base material fracture were separated, an interesting finding was observed. In the vinyl resin group, 6 of the 11 repairs were due to tooth fracture, leaving only 5 repairs or 7/10 of 1 per cent of the total number of dentures studied with base material failure, compared with a base material breakage rate of 8.7 per cent of the acrylic resin dentures. In the acrylic resin dentures, 41 of the repairs were for tooth fracture and 59 repairs were for base material fracture. Thus, the rate of fracture of acrylic resin base material was approximately 12 times as great as for the vinyl resin, and the rate of fracture of porcelain teeth six times as great as for the Luxene teeth. It is also of interest to note that a complete, comprehensive study of our records reveals that of 2,385 vinyl resin dentures that have been made in the past four years, only 12 required repair, yielding a breakage rate of only 0.005 per cent. These dentures were not included in the study described since a five-year observation study was not available.

From comparison of these figures it can be seen that the vinyl resin dentures as studied performed in a superior fashion insofar as breakage of either base material or teeth were concerned.

SUMMARY AND CONCLUSIONS

From the records of 16,500 denture patients, the records of 1,390 dentures were chosen at random as the material for the study of the rate of fracture of acrylic resin denture base material containing porcelain teeth as compared with the rate in vinyl resin base material with vinyl resin teeth, when subjected to typical clinical wear over a five-year period in a group of private patients. An additional 2,000 patients were queried by mail as a check against the clinical study. Both gave similar results revealing that the acrylic resin dentures containing porcelain teeth were fractured nine times (8.5 to 1 in the group queried by mail) more frequently than the vinyl resin dentures containing vinyl resin teeth. Tooth fractures and base material fractures were studied separately and in each instance the vinyl plastic material gave a superior performance.

Clinical testing of dental materials is an important method of determining their usefulness in dentistry. Complete dentures made with a vinyl resin base and vinyl resin teeth had only one ninth as much breakage as did dentures with an acrylic resin base and porcelain teeth. Vinyl resin teeth have a much lower rate of fracture than do porcelain teeth when subjected to clinical wear.

This study supported by a grant-in-aid from the Luxene Corporation, New York.

*Department of dentistry and oral surgery, Henry Ford Hospital.

The Piltdown Hoax • A remarkable and shocking hoax perpetrated on unsuspecting scientists was the manufacture of Piltdown man by some learned but fun-loving anthropologist. . . . About 50 years ago Charles Dawson, a lawyer and amateur antiquarian, while walking near Piltdown Common . . . found a very thick piece of a parietal bone. . . . The next autumn Dawson found another and larger piece apparently belonging to the frontal region of the same skull. Eminent paleontologists and anthropologists quickly took over the continuing search. They found the right half of an ape-like mandible with two molar teeth remaining. Later two human nasal bones, a fragment of a turbinate bone, two further pieces of skull, a molar tooth, and an ape-like canine tooth were found. These are all the elements constituting what was known as Piltdown I and II. Smith Woodward, an eminent paleontologist, believed that the cranium and jaw belonged to the same individual. The fact that the molar teeth were worn down in a manner peculiar to man and not to apes supported the belief that the bones in fact came from a very ancient man. . . . Recent studies by Weiner, Oakley, and Le Gros Clark, measuring fluorine content, demonstrated that the Piltdown I mandible and canine tooth and Piltdown II molar teeth came from a modern anthropoid ape. The skull was of fairly recent date. . . . The great Piltdown hoax, an example of literal skulduggery, shows us an error or joke confusing nearly everyone by its cunning. Most of us are not alert enough to avoid such traps. *W. B. Bean, The Natural History of Error, A.M.A. Archives of Internal Medicine, February 1960.*

Factors affecting bonding to human enamel with special reference to a plastic adhesive

Lennard T. Swanson, D.M.D., Boston, and*
Joseph F. Beck, D.M.D., Auburndale, Mass.

After preliminary screening had indicated that a new plastic bonding agent, Eastman 910 adhesive, most nearly met the requirements of an adhesive for clinical application in dentistry, in vitro and in vivo tests were carried out with this adhesive. The following factors were found to be important: (1) the enamel surface must be clean, etched with acid and dry; (2) contact between enamel and adherend must be the best obtainable, and (3) the use of a waterproof adherend is necessary to protect the bond from moisture. Moisture is the greatest deterrent to a solution of the problem. No satisfactory solution was found to the clinical objective of bonding to enamel without mechanical retention.

In recent years a large number of household and commercial adhesives have been developed. Amazingly strong bonds can be formed between a great variety of substances, and in most instances the results measure up to advertising claims. It is only natural that these discoveries aroused interest within the dental profession, where the need for bonding of materials confronts the clinician in almost every operation: banding a tooth, placing a restoration, or repairing a denture.

The characteristics of an adhesive satisfactory for clinical application are so exacting that most really good bonding agents are ruled out on the basis of setting time alone. Briefly stated, the requirements include: adhesiveness to tooth structure, resistance to mouth fluids, lack of toxicity to living tissue, and a setting time practical for operating room conditions and patient comfort.

Investigations by others[1,2] intrigued by this problem indicate that no known substance is capable of forming a satisfactory bond to tooth structure under oral environmental conditions.

Buonocore[3] reported that in clinical trials etching of the enamel surface with acid increased the lasting quality of a bond formed between acrylic resin and enamel a hundredfold. This introduced an entirely new concept; perhaps a satisfactory bond could be developed if optimum conditions could be determined for each of the variables involved: the enamel, adhesive, or adherend (material to be bonded). The screening of some 17 dental materials by Rose and others[1] indicated that none of the materials tested maintained an adequate bond when immersed in water. What could be done to protect the bonded margins from the deleterious effects of water and oral fluids?

The objectives of this investigation,

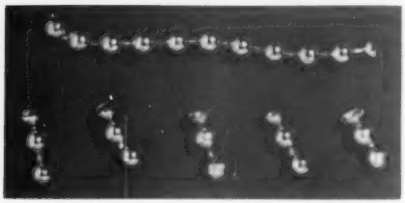

Fig. 1 • Above: Uncut spherical linked chromed brass pull-chain. Below: Three link segments with terminal spheres cut to provide receptacle for adherend

therefore, were directed toward: (1) the screening of new materials with reported adhesive potential; (2) the improvement of bond strength by altering the substrate (tooth enamel), adhesive, adherend, or bonded margins and (3) the clinical evaluation of promising combinations.

MATERIAL AND METHODS

Irregularity and small dimensions of the enamel-covered tooth surface made standardization of bonded contact area difficult. Since the Eastman 910 adhesive has a very low viscosity, an accurate fit between substrate and adherend is essential. Metal burnished to conform to the tooth contour did not meet this requirement. Metals with sufficient rigidity to withstand the work load were found to lack the malleability necessary to insure good adaptation. Because of the rapidity of polymerization, fitting had to be carried out prior to the application of adhesive, but it then proved to be impossible to replace the metal bracket in exactly the same position when the bonding procedure was carried out. The obvious solution was, of course, to use an adherend with plasticity which would set after bonding to the tooth.

Short lengths of chromed brass pull-chain, consisting of spherical links, provided the necessary container for such adherend, and a convenient handle for attaching testing weights as well (Fig. 1). The terminal sphere, when cut in half, presented a uniform circular area 12.56 mm.,^{2} 4 mm. in diameter (Fig. 1). The resulting hemisphere was overfilled with the adherend to be tested and pressed to the tooth surface to which the adhesive had been applied. After the initial set, the excess was removed up to the margins of the hemisphere.

Pressure was exerted by a spring clothespin modified to receive the tooth-chain assembly during the setting of the adhesive (Fig. 2). At the point of contact, the spring provided a force of approximately 1.7 kg., varying somewhat with the size of the tooth. Additional pressure could be exerted by mounting the clothespin assembly in a spring clamp which delivered a force of 2.6 kg.

For testing, a simple tensile device was constructed (Fig. 3). It consisted of a heavy laboratory stand with adjustable clamps so that a perpendicular force could be applied to the bonded surface. A platform was attached to the free end of the chain, and weights were added in 100 Gm. increments. The breaking point was recorded in kilograms.

Preliminary screening indicated that best results were obtained with an epoxy resin and Eastman 910 adhesive. Because

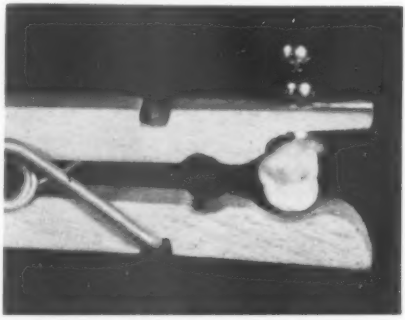

Fig. 2 • Modified spring clothespin providing constant force during bonding. Note excess adherend which was removed to hemisphere margins after initial set

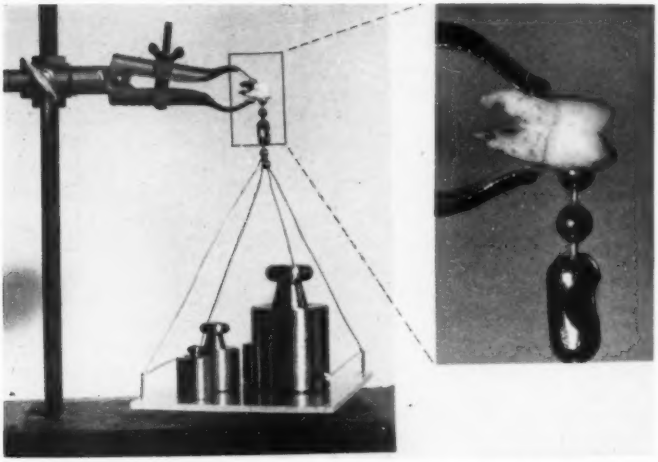

Fig. 3 • Simple tensile strength testing device consisting of a heavy laboratory stand with adjustable clamps. The use of linked chain facilitated the attachment of weight supporting platform and provided container for adherend as shown in close-up

of the prolonged setting time of the epoxy resin it was not considered practical for clinical application. The Eastman 910 adhesive[4] seemed to be the closest to an ideal material. It is a clear thin colorless liquid and is a cyanoacrylate modified with a thickening agent and a plasticizer. Polymerization takes place at room temperature, in thin layers, without appreciable change in volume. When used with an accelerator, a 1 per cent acetone solution of phenyl ethyl ethanolamine, a setting time of less than one minute is attained.

STUDIES IN VITRO

The substrate consisted of freshly extracted teeth with at least one intact enamel surface. The soft tissue was cleaned off the teeth and organic debris was removed with hydrogen peroxide. The teeth were then quick-frozen and stored in a deep freeze to be used as needed. Since protein film and debris had been removed by the peroxide treatment, a "dry" surface was provided by wiping the tooth with a cotton roll saturated with 95 per cent ethyl alcohol, after which dry cotton and a stream of compressed air were used for a few seconds.

The data under conditions tested are summarized in the table. The enamel was etched with 85 per cent orthophosphoric acid by allowing a drop to remain on the surface for 60 seconds. The treated specimens were then washed under warm running water and dried with alcohol as was done previously.

Self-curing acrylic resin, although having desirable working properties, was not a suitable adherend. When subjected to moisture, the quality of the bond was not satisfactory. It dropped from a mean dry measurement of 7.4 kg. to 1.6 kg. after storage in water for one week, and to 0.9 kg. after two weeks in water. The significant reduction of bond strength in the presence of moisture did not necessarily indicate a breakdown of the adhesive per se. This could be due to water sorption of the acrylic resin, which per-

Table • Tensile strength of Eastman 910 adhesive bond in vitro

No. of specimens	Etched enamel	Time between bonding and testing	Condition of specimen when tested		Time specimen stored in water after bonding	Bond silicone coated	Adherend: acrylic resin	Adherend: amalgam	Tensile strength	
			Dry	Wet					Mean in kg.	Range in kg.
20		24 hrs.	X				X		5.8	2.–9.9
20	X	24 hrs.	X				X		7.4	4.8–9.5
25	X	30 min.	X				X		2.1	1.3–4.0
10	X	1 hr.	X				X		2.5	2.0–2.9
10	X	2 hrs.	X				X		2.8	2.1–4.4
20	X	24 hrs.		X	24 hrs.		X		7.4	4.8–9.5
10	X	1 wk.		X	1 wk.		X		1.6	1.0–2.7
10	X	2 wks.		X	2 wks.		X		.9	.2–1.8
10	X	24 hrs.		X	24 hrs.	X	X		7.3	4.3–9.2
10	X	1 wk.		X	1 wk.	X	X		2.0	.6–4.7
10	X	10 wks.		X	10 wks.	X	X		1.9	.9–3.6
10	X	24 hrs.		X	24 hrs.			X	4.6	3.5–5.7
10	X	10 wks.		X	10 wks.			X	2.3	2.0–3.7

Bond contacting surface—constant at 12.56 mm.²
Force applied during bonding—constant at 4.3 kg.

haps not only weakened the bond between the adhesive and acrylic resin but also allowed moisture penetration to the total surface of the adhesive, and hence weakened its bonding qualities sufficiently to cause separation. The latter seemed more plausible because most of the separations were found to be between the enamel and adhesive rather than at the junction of the latter with the acrylic resin. Tests were made, therefore, using amalgam as the adherend. The mean tensile strength for the amalgam samples tested dry was significantly lower (4.6 kg.) but after submersion in water for ten weeks it was better (2.3 kg.) than the results of similar tests made with the acrylic resin (0.9 kg. after two weeks submersion). The decrease in dry test values may have been due to lack of proper condensation of the amalgam. Bonding potential may also have been less to the alloy than to the acrylic resin.

The next area for investigation centered on the protection of the bonded margins from moisture by a surface coating. Extensive inquiries indicated that no known material would be suitable for clinical use. Petroleum products would be dissipated in a short time as well as being unpalatable. Quick-drying lacquers afforded no protection. Two samples of silicones were tested and found to be equally unsatisfactory. One, a silicone lubricant, gradually floated to the surface of the water in which the samples were stored. The second, a silicone resin having more body, was easier to apply and was retained longer in the undisturbed water bath.

The results of surface coating with silicones indicated that the protection attained was far from complete.

STUDIES IN VIVO

Although the afore-mentioned experiments indicated that moisture was a great deterrent to the successful use of the Eastman 910 adhesive in the mouth, the in vitro experiments under wet conditions gave values which, if reproducible in the mouth, would provide bonds of adequate strength for many clinical procedures. In fact, some of the findings were encouraging. For instance, intermaxillary elastic forces used for orthodontic tooth movement are generally rated at about 0.1 to 0.15 kg., well below the lowest mean value of 0.9 kg. for wet specimens

(uncoated bonds using acrylic resin as the adherend). It is true that orthodontic attachments are subjected to much greater forces in the mouth than those provided by the elastic traction alone. Still, attachments could be set up to minimize accidental dislodging and the area covered could be increased considerably beyond the standard circular area of 12.56 mm.^{2} used in the afore-mentioned experiments.

Sufficient toxicological studies have not been carried out on the Eastman 910 adhesive. Animal experimentation by the manufacturer indicated that the monomer was irritating to mucous membranes of the respiratory passages when saturated vapors were inhaled. We therefore approached the clinical use of the material cautiously, testing it on ourselves. No reactions were noted, not even when the adhesive was applied directly to the dried mucosa. In fact, the main problem proved to be in keeping it off our fingers where it seemed to set almost instantaneously, and resulted in bonds so tenacious that separation of one's fingers was truly painful.

No inflammatory or allergic reactions were seen in 24 patients on whom the material was used. Repeated applications on the same tooth and different teeth were made on these patients. This should not be construed to mean that the material is considered clinically safe and no claims are made by the manufacturer to this effect.

Many different types of attachments were tried, none of which was completely satisfactory. An early "standard" attachment was made by welding a hook to a piece of .004 stainless steel band material 4 mm. square.

Five tests were made as follows: the tooth was cleaned with pumice and a rubber cup, washed with 95 per cent ethyl alcohol and dried with compressed air. A drop of Eastman 910 adhesive was applied to the tooth. Self-curing acrylic resin was painted on the stainless steel and the attachment was pressed to the tooth while the acrylic resin was still soft. The attachment was held firmly in place by digital pressure for one to two minutes. Care was taken to cover all edges of the metal bracket with more self-curing acrylic resin after the initial set. All five attachments came off spontaneously in less than one week.

Etching the enamel with orthophosphoric acid gave better results. Fifteen bonds were tested. The teeth were cleaned with pumice, exposed to the acid for one minute, washed with water and dried with alcohol and compressed air. The bond strength was not predictably uniform. Some bands came off within 24 hours whereas others stayed on for four weeks and were subjected to varying types of orthodontic forces. The results can only be classified as unsatisfactory.

To eliminate water absorption via the acrylic resin, metal attachments were made to give better surface adaptation than could be achieved by the band material alone. Platinum foil was carefully burnished directly to the teeth or to casts made from alginate impressions. The dead soft foil was then reinforced by the application of 18 carat solder on the outer surface. Hooks were soldered on with 14 carat solder. This did not improve the end result, however. The landmarks on the smooth surface of the enamel are not sufficiently well defined to make possible the reapplication of the finished attachment to exactly the same position as that of the carefully adapted foil.

The adhesive's lack of body was a distinct disadvantage, in that even small discrepancies between the substrate and adherend were not filled and obliterated by the bonding agent. Addition of fillers, therefore, was given some consideration. Because of the extreme reactivity of the adhesive, many fillers simply precipitated the chemical reaction, resulting in rapid polymerization. Powdered lucite could be added in varying amounts up to 10 per cent by weight. This improved the work-

ing consistency of the bonding material but decreased the wet strength of the bond. Here, also, gradual polymerization took place, although the mixture remained usable for at least two weeks. The manufacturer is currently investigating fillers and waterproofing additives.

DISCUSSION

No satisfactory solution was found to our clinical objective: the bonding to enamel without mechanical retention. The many inquiries made by others during the course of the studies indicates the current interest in the problem. It also seemed to justify a preliminary presentation of the findings in the hope that they might be helpful to those whose approach to the problem may lead them to speculate along similar lines.

The fact that clinical trials were in general much less successful than the in vitro tests made under simpler controlled conditions can be explained in part and is worthy of contemplation. There is the possibility that moisture exchange through the living tooth may cause eventual breakdown of any adhesive susceptible to moisture. If this is so, it would be safe to say that no material is currently available which is capable of effecting an adequate bond. Improved adhesives will surely be developed and it may be that chemical linkage to enamel components will afford the desired solution. The silicones or other agents may provide the necessary moisture seal from without. The chemical industries must be made and kept aware of the problem and the advantages to dentistry of adhesives which will meet the rigid requirements of dentistry.

It is clear that new agents or modifications of existing ones must be considered in many ways. The testing procedures herein discussed are not meant to be all-inclusive. For instance, shearing strength, effects of alternate wetting and drying, dimensional stability of components, to mention a few, were not given due consideration.

The oral cavity is not conducive to the creation of optimum bonding conditions. Humidity is high. It is difficult to maintain a sustained pressure during the chemical reaction. As was noted, maximum bond strength is not achieved during initial set, thus the slower polymerization or hardening must take place in the presence of the oral fluids. Furthermore, during this period it is natural for the patient to exert forces on any attachment, even if a work load is not applied, as the new bulk is annoying.

SUMMARY

Extensive tests were carried out on a new plastic bonding agent, the Eastman 910 adhesive. This material was selected because it most nearly met the essential clinical requirements of the adhesives tested. Under experimental conditions, the following factors were found to be important: (1) the enamel surface must be clean, etched with acid, and dry; (2) contact between enamel and adherend must be the best attainable and (3) the use of a waterproof adherend or an adherend covered by a waterproofing agent is necessary to protect the bond from moisture. Moisture is by far the greatest deterrent to the solution of the problem.

None of the many materials tested to date produced a bond of practical usefulness under oral conditions.

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*Orthodontist, Children's Medical Center, Boston; clinical associate in orthodontics, Harvard School of Dental Medicine, Boston.

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Some interrelations between German and American dentistry, 1800-1914

George B. Denton, Ph.D., Chicago*

Two great national dental organizations celebrated the centennial anniversary of their founding in 1959; namely, die Deutsche Gesellschaft für Zahn- Mund- und Kieferheilkunde (formerly der Central-Verein Deutscher Zahnärzte) and the American Dental Association. On this occasion it is good to look back through the one hundred year period and note the contacts between the professions in America and the German-speaking countries, and to trace the influences which each group exercised on the other. Especially interesting are those early relations which existed before improved international communication had almost obliterated national professional traits, scientific and technical, and spread a nearly common knowledge and practice throughout the civilized world.

American dentistry at the beginning of the nineteenth century consisted of a large portion of native ingenuity combined with the eighteenth century dentistry of France and England. These foreign influences are those revealed exclusively in the scanty professional literature of the first four decades of the century. The earliest American work on dentistry of any considerable extent was Samuel Sheldon Fitch's *A System of Dental Surgery*, 1829, a compilation for the most part. In his preface and in his footnotes, Fitch listed his sources, which are mainly in French and English with a few Latin works. French authors of the eighteenth century and earlier included by Fitch are Martin, Fauchard, Bourdet and Jourdain; of the nineteenth century, he includes Duval, Laforgue, Delabarre, Lemaire, Baumes, Audibran, and Rousseau. English dental works referred to are by Hunter, Blake, Fox, Murphy, Parmly, Koecker. Fitch's sources are characteristic of American dental literature to almost the middle of the century. Fitch was exemplary of the educated American dentist. Whereas he was familiar with the best authors in French and English in the dental field, he was completely ignorant of the German professional literature.

At the beginning of the nineteenth century professional books were scarce in America, especially books in languages other than English. A study of libraries containing dental works should throw some light on the sources of the professional knowledge of American dentists. The only dental libraries in America were the private possessions of a few leaders of the profession. Two outstanding ones of which we have information with regard to their contents are those of Chapin A. Harris and of Eleazer Gidney.

Gidney was an American who had

practiced in New York, but who during the years 1824 to 1827 studied dentistry abroad, especially in England and France, under the foremost dentists of that time. While in Europe he collected a considerable library of professional literature which he brought back to America with him in 1827. In 1831 he returned to England, where he practiced in Manchester, for most of the next 26 years. Apparently, he left his library in New York City, for as stated in the first issue of *The American Journal of Dental Science,* in 1839, Gidney lent his private dental library to the editors of the *Journal* for their use. A complete catalogue of the works contained was given on pages 23 and 24 of this *Journal.* There were 67 works in the collection, of which 59 were dental and 8 were on anatomy, medicine or general science. It represented, very fairly, the best dental literature of the world, with the exception of the German, down to that day. There were 34 books in French; 23 in English, of which only four were published in America; none in German; and one, each, in Italian and Latin.

Chapin A. Harris had great need for a fine library during the last 20 years of his life. He was dean of Baltimore College of Dental Surgery; he was editor of the *American Journal of Dental Science;* he was author of a textbook, *Principles and Practice of Dental Surgery;* and he wrote a dental dictionary. His library served not only for his own purposes, but also as a source of information for his students. It is not remarkable that it should have been called in the school publicity "the best dental library in the world." It was undoubtedly the best dental library in the United States. The contents of this library was listed in a catalogue published about 1865 when, after Harris' death, the books were sold at auction. The catalogue, still extant, indicates that there were more than 260 books and about 90 volumes of journals in the collection. There were both medical and surgical works in various languages, as well as most of the important dental works of the time. Among the books of dental import were 11 works of German origin. These were as follows:

Andree, C. A. *de prima puerorum dentitione.* Lipsiae, 1790; Becker, G. W. *Ueber die Zähne.* Leipzig, 1808; Blumenthal, C. A. *Nähere Prüfung der Aetiologie der Zahnarbeit der Kinder . . .* Stendal, 1799; Carabelli, Georg. *Anatomie des Mundes.* Plates. 2 vols. Vienna, 1842; Ettmueller, C. F. B. *Abhandlung über die Krankheiten der Zähne . . .* Leipzig, 1798; Koecker, L.[1] *'Dissertatio inauguralis medicae jodinae.* Erlangen, 1823; Kollicker, A. *Manual of Human Microscopical Anatomy.* Philadelphia, 1854; Linderer, J. *Die Erhaltung der eignen Zähne.* Berlin, 1842. *Handbuch der Zahnheilkunde.* Berlin, 1842; Albrecht, J. F. E. *Sichere Mittel gegen das Zahnweh . . .* Hamburg, 1812; Schmidt, Karl. *Theorie und Erfahrung über die Zähne, ihre Gesundheit zu erhalten.* Dresden, 1808.

For comparison, it may be noted that whereas there were only 11 German works included, there were 52 of French origin, 46 in the original and 6 in English translation.

These relative figures on the libraries of Harris and Gidney show clearly that in the early part of the nineteenth century, German dental literature had little relative influence on the dentistry of America.

One of the chief channels of influence between the two countries was the interchange of professional persons.

The first American dentist to immigrate to Germany with the intention of practicing dentistry was Francis Peabody Abbott,[2] a young man just graduated from Baltimore College of Dental Surgery in 1851. Arriving in Berlin, he applied for permission to practice in 1852; but, under the stringent laws forbidding unnaturalized foreigners to practice dentistry in Prussia, permission was refused.

Abbott was disinclined to surrender his citizenship in the United States, and so with the consent of the surgeon in charge he began practicing his profession without pay in the Königliche Preussische Krankenanstalt, and thus got favorable notices from the physicians. He then applied directly to the Ministerium der Medicinal-Angelegenheiten through the American legation and shortly thereafter received permission to practice for two years. Abbott, having married the daughter of the then secretary to the United States legation in Berlin, Theodore S. Fay, rapidly gained social prestige as well as professional recognition.

Abbott's house became the center of the American colony in Berlin, socially as well as professionally. To all Americans he gave help. He advised his countrymen as to where the best places were to locate in Europe. He granted consultation about the treatment of patients of American dentists, and he referred his own patients in distant cities to later arrivals from America in whom he had confidence.

At the time of Abbott's death in 1886, the *Deutsche Monatsschrift für Zahnheilkunde* declared that of the many American dentists who had come to Germany since Abbott, none had exercised such influence on the dentistry of the nation. His greatest influence on German dentistry was, according to *Die Monatsschrift,* in setting up a model technic in gold filling, which stimulated German dentists to emulate. He also introduced tin-gold as a filling material.

Abbott's assistant as early as 1854 was the Belgian, Seraphim Hubert Dumont, a graduate of Baltimore College in 1850, who remained with Abbott for many years.

Among the persons who came under the influence of Dr. Abbott was Willoughby Dayton Miller.[3] Miller received a thorough scientific education, as well as completing an arts course in the University of Michigan (1875), and pursued special studies in chemistry, physics, and applied mathematics at the University of Edinburgh, which he continued in Berlin in 1876 and 1877. Here he drifted into the American circle of Dr. Abbott, who submitted a number of professional problems to Miller's chemical knowledge. At this time, Miller received his first lesson in dentistry from James Truman, who was a visitor in Berlin. Miller had planned to devote his life to science, especially physics, but Dr. Abbott persuaded him to go into dentistry. Miller returned to America to take a course in dentistry at Philadelphia College of Dental Surgery and was graduated with the degree Doctor of Dental Surgery from the University of Pennsylvania in 1879. He then returned to Germany, married Dr. Abbott's daughter and became Dr. Abbott's assistant. When Das Zahnärztliche Institut of the University of Berlin was founded in 1884, Miller who had secured approbation as Zahnarzt, was appointed teacher in the Institut as professor of operative dentistry. Since his return to Germany, he had carried on studies in medicine and bacteriology and in 1888 was granted the degree of Dr.med.

It is not necessary here to discuss the significance of Miller's great work to dentistry throughout the world. It is necessary only to emphasize that he stands in the two-fold relation of being both German and American. His science, as represented by *Die Microorganisms der Mundhöhle* (1889), was German, but his dentistry, reflected in his *Lehrbuch der Conservierenden Zahnheilkunde* (1896), was American.

Another prominent American whose career touched German dentistry in several respects was James Truman[4] (1826-1914). He was graduated from the Philadelphia College of Dental Surgery in 1854. In 1865, he became professor of dental physiology and operative dentistry at Pennsylvania College of Dental Surgery. From 1865 to 1870, he was editor of the *Dental Times* published by that

school. In 1876, he resigned his professorship and went to Germany, where he established a practice in Hanover. Upon the death of his wife in 1880, he returned to Philadelphia. In 1882, he became professor of dental pathology, therapeutics, and materia medica in the dental department of the University of Pennsylvania, and later, dean. From 1890 to 1905, he edited the *International Dental Journal*. He was president of the first American Dental Association at its last meeting in 1897, when the organization united with the Southern Dental Association to form the National Dental Association.

Truman's editorials in the *Dental Times* and his reviews in that journal evidenced his familiarity with German periodicals and the German book literature of dentistry. It was through the *Dental Times* in 1868 that the term "pyorrhea alveolaris," for many years in use by German dentists, came to the notice of American practitioners. His association as tutor and instructor of Henriette Hirschfeld during the years of 1867-1869 furnished opportunity for developing his interest in German dentistry. He acquired acquaintance at first hand with German dentistry in the four years during which he practiced in Germany.

Newell Sill Jenkins,[5] born in 1840, was a native of Massachusetts. He received a Doctor of Dental Surgery degree from Baltimore College in 1863 and began to practice in Bangor, Maine. Because he thought a change of climate would benefit his health, he moved to Germany in 1866, and on the advice of Francis P. Abbott, settled in Dresden. Here for many years he served an international clientele including Abbott's Dresden patients, who were referred to him. Jenkins received the title *Geheimer Hofrat* from the king of Saxony. He retired in 1909, after more than 40 years of practice abroad. Jenkins was particularly celebrated in Europe because, in response to the demand there for a filling material to take the place of gold, he produced a porcelain more esthetic and more durable than Herbst's glass filling, commonly used. Jenkins was distinguished in America by receiving the Jarvie Fellowship Medal.

Americans such as these more distinguished invaders of German dental practice, as well as others of lesser talents, brought with them the procedures of dentistry from the United States. American influence was also spread, perhaps even more effectively, by the many Germans who came to America, studied dentistry, and returned to practice with the degree of Doctor of Dental Surgery. Adolf Petermann's *Zahnärztlicher Almanach* for 1878 lists 55 such practitioners out of a total of 581 in Germany and Austria combined; so that almost one in every ten practitioners on the average had an American dental training.

The compiler of the *Almanach*, who was also a graduate of an American school (The Philadelphia Dental College, 1869), assured his readers that these practitioners with American degrees had received them for work in course and did not belong to the group which was attempting to invade Europe with nothing but a purchased diploma to qualify them for the practice of dentistry.

In respect to dentistry the relations between the United States and Germany were different from those in respect to medicine. A recent interesting article by the historian, Thomas N. Bonner,[6] on "German Doctors in America, 1887-1914," presents the thesis that in the earlier years, German physicians who visited America observed American medicine in practice and criticized it, but did not come to study in America. He remarks in a footnote: "Only in dentistry did the American play tutor to the energetic German: a significant number of German students came to America to study dentistry before 1914 . . ."

A few of the students who came to America and acquired dental degrees at the dental schools of that country re-

mained there to practice their profession, but most of them returned to the homeland. Among the latter were several who were distinguished in Germany before emigrating, although not in dentistry, and some who rose to eminence on their return as dentists.

Among the better known Germans having graduated from American dental schools and having returned to practice in German countries, one of the best known was Friedrich Louis Hesse,[7] who was born in 1849 and died in 1906. He had already attained the position of Prosektor in the University of Leipzig teaching anatomy when in 1880 he went to America. He was graduated from the New York College of Dentistry in 1882 and returned to Germany to practice dentistry and to teach it in the University of Leipzig. Hesse advocated dental schools on the model of the American. When the Dental Institute of the University of Leipzig was established in 1884, Hesse became its director and, for the first three years, its sole professor and teacher. Many Germans who remained in Germany learned American dental technics at the Institute under Hesse.

Georg von Langsdorff[8] was graduated from Ohio College of Dental Surgery in 1861 and received approbation in Baden in 1862. He began to be prominent in the Central Verein in the early '70's, and was elected one of the Vorsitzenden in 1874. Several papers by him, read before the Central Verein, dealt with educational subjects. He advocated the establishment of dental schools similar to those in America and urged the founding of a dental teaching institute.

Pierre Calais[9] was born in Hamburg where his father and grandfather had practiced dentistry. He was third in a series of five generations of dentists who in 1934 completed 125 years of service. He studied at the universities of Heidelberg and Göttingen. After receiving his medical degree (1857), he studied at the Pennsylvania College of Dental Surgery, where he was graduated in 1859. He was elected Vorsitzender at the 1889 meeting of the Central Verein, and in 1890 was an officer of the Dental Section of the Tenth International Medical Congress. Pierre Calais' son Peter (born 1869) was graduated from the University of Pennsylvania dental school in 1898.

Ludwig Adolf Weil,[10] born in Wallenstein (1849), received the medical degree from the University of Strassbourg in 1873 and the dental degree from Pennsylvania College of Dental Surgery in 1876. He was appointed court dentist to Prince Ludwig of Bavaria and taught dentistry at the University of Munich. He was known for his method of histological research and for the discovery (1886) of the basal layer of the dental membrane (known as Weil's layer). He published *Histology of the Tooth Pulp.*

Fritz Schaeffer,[11] born in 1868, was the son of a master baker who wished to marry the daughter of a dentist by the name of Stuckert, an American with an American degree. To win over his prospective father-in-law, Schaeffer studied dentistry in Germany and received approbation in 1889. He joined his father-in-law in practice and assumed the name Schaeffer-Stuckert. Being dissatisfied because he lacked the degree Doctor of Dental Surgery, he went to New York, attended New York College of Dentistry, and was graduated in 1895. Schaeffer-Stuckert appeared on many professional programs in Germany from 1906. From 1902 to 1921, he was Schriftführer of the Central Verein. He was general secretary of the Fifth International Dental Congress. He continued Parreidt's History of Central Verein, in his *Geschichte des Central-Vereins Deutscher Zahnärzte,* 1909-1934.

Adolf Hartung,[12] born in 1817, came under the American influence indirectly. He was trained as a surgeon but during an extended visit of his brother, who was a practicing dentist in New York, Adolf

Hartung's interests were turned toward dentistry and he acquired the technic from his brother. Hartung's practice was devoted largely to maxillofacial surgery. He was first Vorsitzender in the Central Verein from 1876 to 1879.

A number of German women came to America to study dentistry. The most distinguished of these was Henriette (née Pagelsen) Hirschfeld-Tiburtius.[13] She applied for entrance to the Pennsylvania College of Dental Surgery in 1867. Through the intervention of James Truman, she was finally admitted, although dentistry was not regarded as a woman's occupation. She was graduated in 1869, and returned to Berlin, where she established a highly successful practice serving only women and children.

There were many more Germans who obtained an American dental education in the schools in Baltimore, New York, Philadelphia, Cincinnati, and other cities in the U. S. By the early twentieth century, the graduates from these schools practicing in German countries could be counted in the hundreds. The immigration did not cease with the founding of the dental institutes in Berlin and Leipzig in 1884. Along with the legitimate training of dentists by ethical schools, also the diploma mills flourished and did much to discredit the American dental degree abroad.

Visiting American dentists of distinction also did much in the early days to demonstrate American methods during a time when resident quacks from America discredited the diploma of that country. Typical examples are the two visits of William G. A. Bonwill[14] in 1889 and in 1897. On the latter visit he was elected Ehrenmitglied of the Central Verein.

The earliest person of German origin to practice in America was Leonard Koecker[15] (b. 1785 - d. 1850), who was born in Bremen. Leonard Koecker, however, did not bring the influence of German dentistry to bear on America, for he was practically ignorant of the profession when he was 22 and came to this country in a commercial capacity. His business venture failing, he had fallen back on some little knowledge of dental instruments which he had acquired when he was 15 years old, and in 1807, he began the practice of dentistry in Baltimore. Much of his *Principles of Dental Surgery* (London, 1826) constituted a system of diagnosis and treatment which he had developed independently and which bore no relation to current German work of which he had no knowledge.

Who among the Germans was first to come to America as a German dentist?

None of the Germans who came to America in the early years had dental training before emigrating, although some had scientific or medical education. The earliest was probably either Adalbert Volck, who certainly arrived in the United States in 1848; or George Friedrichs, who was in America by that year.

Volck[16] was a versatile genius who had majored in chemistry at the University of Munich, and who became an artist in the fields of ceramics, metal work, painting, and caricature, as well as a dentist of the highest order. He was born in 1828, and in 1848, joined a short-lived revolt against King Ludwig of Bavaria and as a consequence fled to America. There he became assistant in the office of Nathan C. Keep and attended Harvard University. In 1852 he was invited by Chapin A. Harris to come to Baltimore College of Dental Surgery and assist in the teaching of chemistry. He received the degree of D.D.S. in 1852 and began practicing in Baltimore. He worked with Christopher Johnson on microscopic dental anatomy. He was charter member of the Maryland State Dental Association (1833) and retired in 1902.

His art work is considered among the best produced in America. As a caricaturist, he supported the South in the Civil War and ridiculed General Ben Butler. An admirer referred to him as the "Benvenuto Cellini of Baltimore."

George J. Friedrichs[17] was born about 1830 in Ebermannstadt, Bavaria, came to America, and in 1848 began the study of dentistry under a tutor. He graduated from Ohio College of Dental Surgery in 1855, and practiced for over 50 years.

One of the Germans who made a most distinguished record in dentistry in the early years was F. H. Rehwinkel,[18] who was born in Celle, Hanover, Germany, in 1825. He was a graduate of the medical school of the University of Göttingen when he came to the United States in 1849 and commenced the practice of medicine at Natchez, Tennessee. In 1853, he became interested in dentistry and was graduated from Baltimore College of Dental Surgery in 1854. From that time he devoted his interests and practice to dentistry. He became successively president of the Ohio State Dental Society, the Mississsippi Valley Dental Association, and the American Dental Association in 1877. He contributed many articles to the American dental periodicals. The term "pyorrhea alveolaris,"[19] first borrowed by Truman in translations from the German, was adopted by Rehwinkel in a report before the American Dental Association in 1877 as the term of choice to designate the disease. Although Rehwinkel did not reflect any German dentistry in America, his medical education and acquaintance with European dentists enabled him to direct a German influence on American dentistry.

At least one of the early immigrants to the United States from Germany was influential as a teacher and researcher of dental science. Carl Heitzmann,[20] a Hungarian by birth, was a doctor of medicine, but not a dentist. He contributed to German science in the fields of anatomy and physiology. He collaborated with Carl Wedl in 1869 on *Pathology of the Teeth* and *Atlas of the Pathology of the Teeth.*

His reputation as a scientific investigator was based on his microscopical researches and original views on the ultimate structures of tissues. His most prominent theory was the "reticulum theory" of protoplasmic matter as opposed to the cellular theory of Virchow.

His *Microscopical Morphology* was published in 1883; and *Descriptive and Topographical Anatomy* was at the time of his death the leading textbook in all German colleges.

Heitzmann came to New York City in 1874 and opened a histological laboratory in 1877, to which he attracted such men as William H. Atkinson, George C. Mills, Francis Abbott, as well as C. F. W. Bödecker.

Bödecker[21] was born in Celle, Hanover, where he was apprenticed to a jeweler and dentist at five years of age. In 1866, he went to England, where he became assistant to a dentist while studying medicine under a London physician. In 1869, he came to the United States and entered the College of Dentistry in New York City. He was graduated in 1871, received the advanced degree of M.D.S. in 1877. At this time he entered Heitzmann's laboratory and adopted his preceptor's theories. He published the *Anatomy and Pathology of the Teeth* in English in 1894, which was translated into German. He returned to Germany in 1897 and practiced there until 1907.

Rudolph H. Hofheinz,[22] born in Germany in 1856, came to the United States when he was 15 years old. He began the study of dentistry at New York College of Dentistry in 1876, and was graduated in 1879 with highest honors. After a period of practice in Rochester, N. Y., Dr. Hofheinz became associated with the dental school of the University of Buffalo and in 1897, was appointed professor of operative dentistry. He returned to private practice in 1909 at Rochester, and continued there until his death in 1916. Dr. Hofheinz was prominent in the teaching of operative dentistry and wrote numerous articles and pamphlets on that subject. At the time of his death, he was director of the Rochester Dental Dispensary, which he helped to organize.

Hermann Prinz,[23] who was born in Saxony in 1868, emigrated about 1890, practiced as a pharmacist until 1892, and then began the study of medicine in Toledo, Ohio. He took up dentistry at the University of Michigan and was graduated in 1896. Later, while practicing in St. Louis, he received the medical degree.

From 1910 to 1913 he was professor of dental materia medica and therapeutics at Washington University School of Dentistry (St. Louis), and then he joined the faculty of the University of Pennsylvania, where he held the same position until 1938. With John H. Kennerly he edited *The Dental Era*, a journal, from 1902 to 1910. His books, *Dental Materia Medica* (1909), *Diseases of the Mouth* (1935), and *Dental Formulary* (1907) were known internationally. The two earlier works were translated into German. He contributed more than 300 articles to dental journals. In addition to his other teaching duties Dr. Prinz taught the history of dentistry and wrote one small book, *Dental Chronology* (1945).

Dr. Prinz's reputation was perhaps even greater in Europe than in America. He was the first dentist from the United States to be elected to the Deutsche Akademie der Naturforscher (Leopoldina-Carolina) (1933). He was honored in the United States by the Jarvie Fellowship Medal (1922), the Callahan Award (1932), and the Jenkins Memorial Medal. Dr. Prinz died in 1957.

Not until 1868, did representatives of German and American dentistry face each other through their respective literatures and give expression to the contrasting characters and points of view of the professions in the two countries. Soon after the death of Herder in 1866, an energetic, scholarly and versatile young man, Adolph zur Nedden,[24] took over the editorship of *Vierteljahrsschrift*. He was familiar with American dental literature and translated into German Taft's *Operative Dentistry* (1859) and Richardson's *Mechanical Dentistry* (1860). His inventive faculty was shown in the production of a sponge gold which was said to be so easy to place that even poor operators could make good fillings with it. This material is said to have been suggested to zur Nedden by Watt's crystal gold in America.

In the second year of zur Nedden's editorship, he had occasion to review, in *Vierteljahrsschrift*, a statement by Dr. Watt in the *Dental Register*. Dr. Watt had asserted in reply to a remark by Dr. Peebles, before the Chicago Dental Society, that "American colleges in a few years had done more to raise and further dental science and dental practice than the medical schools have been able to do in centuries." To this declaration, zur Nedden replied[25] in his journal:

> It is true that the achievements of the American schools are significant; and we who are on the outside of their educational system acknowledge with gratitude that we have learned much from our transoceanic confreres. Dr. Watt, however, was not correct in stating that these achievements could be extended to dentistry as a science. In regard to technical procedures to be used in dental practice, Americans, because of their dental schools and professional organizations, are superior, but only in this purely technical aspect did we acquire additional knowledge. Dentistry as a science, however, did profit hardly anything or nothing from America. The position of England and Germany in regard to scientific progress appears to be far higher than that of America which proved superior to us only in the technical and manual fields of dental activity. If we consider accepting everything offered to us from the other side of the ocean as either new or significantly improved, by believing all the articles appearing in foreign periodicals, the scientific achievements of Europe, especially of Germany, would be almost systematically overlooked and disregarded.
>
> The contributions to dentistry by Albrecht, Wedl, Neumann, Waldeyer, Hertz and many others have not been mentioned in the American dental literature by even a single word. These American journals frequently have published articles dealing with scientific problems which offer hardly any new points of view and hardly any results of exact research. We still lack many things before we can claim to have achieved our goal. Besides the opportunities provided by our classic education in the sec-

ondary schools and universities, the governmental authorities should follow the requests made by the *Central Verein* to provide dental students with all the means required for a practical and technical training which would make it possible to become a capable and skillful dentist or dental specialist. Then, and only then would our educational goal be reached.

Certainly, also the Americans lack many things. Above all there is a disregard of appreciation for complete scientific education—they seem to be satisfied with a partial scientific education—for dental practice. Many of the American dental schools, which achieve so much in other aspects of dental education, still lack in providing an adequate training in the technics and practices of dentistry on a strictly scientific basis. Such a scientific training, however, is the most important factor which could elevate the dental craftsman to a genuine dentist, thereby raising in rank and stature the entire dental profession. A complete scientific training and a high capability are the prerequisites for making the graduate student an excellent dentist. This can be achieved only by mutual cooperation and assistance.

The editor of *Dental Times*, James Truman, replied[26] admitting zur Nedden's principal charge while explaining and defending it:

As a nation we are not given to live in the speculative. A theory that cannot be coined into use in the practical affairs of life is not respected. . . . As fast as science enters and improves the practical details of human affairs, just so soon does it enter into the hearts of American men, and not much faster.

After stating that "probably nine-tenths of the practicing dentists of this country have had their education in the private office and laboratory," he continued.

Is it surprising, then, that the largest proportion of the ten thousand persons practicing dentistry in this country should demand in their journals only such matter as would advance them to a higher practical standpoint, or that the journals should, to a large degree, cater to this desire, under the belief that time would develop a higher appreciation of stronger intellectual food? Whether this is right or wrong on the part of the conductors of dental journals, it is certainly true that the scientific questions that are occasionally discussed find but few appreciative readers, and, hence, but little effort is made by those interested in the solution of difficult problems in science to bring the result of these investigations before the public through this channel.

A few years later (1872), when zur Nedden died, Truman wrote the following appreciation[27] of his German opponent:

German dentistry owes much to Dr. zur Nedden for his labors in bringing the ideas of workers in foreign professional fields before the dentists of his native land. His translation of American and English works bear witness to his industry and enthusiasm in his profession.

Notwithstanding his intimacy with American work, he felt a large share of that prejudice peculiar to his countrymen towards American dental science, and repeatedly criticised the profession in this country in his journal. While we expressed at the time our belief that he was mistaken to a great degree in this estimate, we always entertained a profound respect for the man as an earnest and devoted laborer in his chosen field.

His knowledge of American and English professional work was very thorough and exact. In every number of the "Deutsche Vierteljahrsschrift" was to be found copious extracts from Association Reports as well as from all the journals. In addition to this, extended translations were made of more important articles. His example in this respect is worthy of imitation on this side. We cannot afford to isolate ourselves from the active minds of other lands; yet, until a comparatively recent period, the mass of readers knew very little of German dentistry.

Germany may have lost more scientific men than Adolph zur Nedden, but few whose departure will be more seriously felt in his profession.

What was the attitude of the German profession toward the dental literature of America and how were the dentists of the United States impressed by the abundant publication in German? Something can be learned by a study of the works translated from one language to the other, and by the comments and judgments of book reviewers.

One of the earliest German books on dentistry to receive notice in an American journal was C. J. and Joseph Linderer's *Handbuch der Zahnheilkunde* (1842) reviewed in the *American Jour-*

nal of Dental Science. The notice,[28] which was probably by the editor himself, Chapin A. Harris, although mildly approving, had a somewhat condescending tone. Here it is:

> Although the Prussians have not contributed as largely as the French, English, or even Americans to the literature of dental surgery, we are nevertheless indebted to them for some very valuable works. As long ago as 1804, a work of 564 8vo pages, written by J. J. J. Serre, was published in Berlin, and although in point of merit, nearly, if not quite equal to any treatise that had at that time appeared on practical dentistry, it has been passed by in silence, by almost every subsequent writer.
>
> With regard to the work now before us, we have not as yet been able to read the whole of it, but from the portions of it which we have perused, we believe it to be one of considerable merit. The authors are certainly men of some science, and the fact that the work has so soon passed into a second edition, the first having been published in 1837, is at least an evidence that it is well thought of in its own country.
>
> The greatest fault which we find with it is, that it is too brief. It does not treat upon the subjects embraced in it, at sufficient length. But taking it as a whole, we are disposed to believe it an excellent "Manual of Dental Surgery," and would be highly gratified to see it in an English dress.
>
> It treats upon the various subjects connected with Dental Anatomy, Physiology, Materia Medica, and Surgery. The plates that accompany it are lithographic, and executed in a very superior manner.

Joseph Linderer received from the Baltimore School of Dental Surgery, in 1851, a degree of Doctor of Dental Surgery honoris causa.

From this early notice to 1914, between 30 and 40 German works, at least, were reviewed in American dental journals. These can be divided between scientific works (including pathology, histology, anthropology, physiology of growth, anatomy, comparative anatomy) and clinical works (including general dentistry, operative dentistry, crown and bridge work, extraction of teeth, local anesthesia, prosthesis, surgery, orthodontics, and endodontics). The works of some of the outstanding dentists of Germany and of the German-speaking countries are among those reviewed. The names include Robert Baume, Julius Parreidt, Otto Walkoff, Karl Witzel, B. Mayrhofer, Julius Scheff, Gustav Preiswerk, Joseph Arkovy, and Carl Wedl. In the main, the early scientific works were analyzed and admired, but sometimes considered too remote from practice. In several of the clinical works, some of the current dental procedures, such as the placing of dentures over retained roots, are disapproved.

Some expressions of the reviewers' biases are enlightening. Of the case histories in Julius Parreidt's *Zahnärztliche Mitteilungen aus der Chirurgischen Universitätspoliklinik zu Leipzig* (1887),[29] the reviewer made the following comments:

> These are principally confined to pathological cases, very few of a practical character being described, as this part of dentistry seems not to be regarded of importance in this institution.
>
> It would seeem to the writer [reviewer] that a large proportion of the operations must prove failures and entirely useless as a means of instruction to students, unless accompanied by filling, etc.

Nevertheless, the book was considered "interesting and instructive" by the reviewer, "worthy a place in the library of every German practitioner."

Of Joseph Arkovy's *Diagnostik der Zahnkrankheiten und der durch Zahnleiden bedingten Kiefererkrankungen*[30] (1885) a reviewer in the *Dental Cosmos* wrote:

> The divorce of theory from practice greatly decreases the value of the book in a practical sense, and will have a tendency to limit its circulation.

Of the books of clinical practice, the reviews often remark that there is nothing new in them, that they are excellent for German practitioners but that some modification would be necessary if intended for American dentists.

The comments in the *Dental Cosmos* on W. D. Miller's *Lehrbuch der Conser-*

vierenden Zahnheilkunde[31] (1896) are interesting:

> There are features of the work which, were it intended for an American audience, would be improved by some modification, but that it is well adapted for its stated field cannot be doubted.
>
> This book . . . might be appropriately termed a text-book of American dentistry in the German language.

The American dentist was not entirely unappreciative of the superior scientific accomplishment of the German. Occasionally admiration and approval were expressed as in a review of Robert Baume's *The Mouth and Its Diseases*[32] (1878).

> As a work showing the higher education which is taking the place of old things in the dental world, and which must do its part in compelling recognition of the capabilities lying in the specialty, we welcome the book warmly. With a few more authors of this same school the necessities of the relation of dental surgery with oral surgery, and consequently with the common mother profession, will be made very plain.

In strictly nonclinical works such as Baume's *Die Kiefer Fragmente von La Naulette und aus Schipka*[33] (1883) and in works with a scientific approach, such as B. Mayerhofer's *Principles of a Rational Therapy of Gangrene of the Pulp*[34] (1909) the reviewer ordinarily confined himself to an analysis of the work, refraining from any judgment in a field wherein he had little or no experience.

Among the works originally appearing in German which were thought sufficiently useful to Americans to be translated were: Leber and Rottenstein's *Dental Caries and its Causes* (1872), translated by Thomas H. Chandler; Parreidt's *Compendium of Dentistry* (1886) translated by Louis Ottofy, with additions by G. V. Black; Miller's *Microorganisms of the Mouth* (1890), an English version by the author; Zinsser's *Syphilis and Syphilis-Like Diseases of the Mouth* (1913) translated by Stein; Bruck's *The Filling of Teeth With Porcelain,* (1902) translated by C. W. Jenkins; Guido Fischer's *Local Anesthesia in Dentistry* (1912), translated by Reithmüller and later (1920) by Louis I. Grossman. The last named work was for many years a standard textbook for dental students in American schools.

Several books originally in English were translated into German. Adolf zur Nedden prepared German editions of Joseph Richardson's *A Practical Treatise on Mechanical Dentistry* and Taft's *Operative Dentistry* in 1860. Edward H. Grunberg under the title *Die Okklusionsanomalien der Zähne* (1914) translated Edward H. Angle's celebrated work. C. F. W. Bödecker's *Anatomy and Pathology of the Teeth* and Herman Prinz's *Dental Formulary* and his *Dental Materia Medica* were translated by their authors into German. Hollaender's *Das Füllen der Zähne und deren Extraktion* (1877) was based on Taft's *Operative Dentistry* and Julius Parreidt's *Handbuch der Zahnersatzkunde* (1880) was based on Joseph Richardson's *A Practical Treatise on Mechanical Dentistry.*

N. S. Jenkins' long residence in Dresden gave him opportunity to study the development of German dentists at first hand. He listed their outstanding accomplishments[35] in 1912 as seen through the eyes of an American:

> The list of branches in which German dentists have made striking progress is too long for detailed mention. In every department of oral surgery they are superb. They are famous in the surgical treatment of chronic periodontitis and for the replantation of teeth which have had chronically diseased roots. This latter is a common operation among German dentists, even in small circles of practice, and is attended generally with favorable results. In local anesthesia, regional and neural, founded upon minute study of the anatomy of the jaws, they are unsurpassed. In the technique of Roentgenology, intra and extra-oral, and in the resulting correctness of diagnosis in abnormalities and diseases of the teeth and jaws, they are unequaled. They have improved the systematizing of orthodontia and cultivated a sounder judgment in this field by their studies in etiology, and made great ad-

vance in bringing into place unerupted teeth by surgical and orthodontic means, and they have also greatly advanced the surgical prosthesis of fractured jaws. They have improved the technique in casting inlays and bridges, as well as in making porcelain inlays. They have refined the methods of local operative treatment in pyorrhea, and invented ingenious and practical methods of splinting teeth loosened by this destructive disease. Their researches in oral bacteriology and their investigation of such subjects as the relation of the thyroid gland to the development of the teeth are indications of the sort of work especially congenial to the mind of the German scientist, and in which he achieves such great results. It is partly temperament, partly education, partly social conditions, from which the German derives this characteristic ardor for abstruse investigation. He loves the pursuit of knowledge, not simply because it brings power, but also because of the richness and splendor which it gives to life.

During this same period the American dentist had also made progress in directions other than clinical practice that brought him closer to the thinking of his German confrere. From the year 1913, when the Research Commission of the National Dental Association was founded, the American dental profession embarked on a program of research and committed itself to the thesis that the ultimate solution of the problems of controlling oral disease depends principally on research. In more recent years, through the Council on Dental Research of the American Dental Association, the International Association for Dental Research and the cooperative projects with the federal government in the National Institutes of Health and the National Bureau of Standards, America has become one of the foremost nations in the promotion of research and in its achievements.

*Research consultant, Bureau of Library and Indexing Service, American Dental Association.

HISTORICAL FOOTNOTES

1. This ascription must be in error: Leonard Koecker had no university connections.
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reports of councils and bureaus

Survey of state dental health programs: Part 1

COUNCIL ON DENTAL HEALTH

A survey of state dental health programs was conducted by the Council on Dental Health in 1958 and 1959[1] to determine their extent and cost, to demonstrate the need for their expansion in the interest of improving the dental health of the public and to show specific types of programs that could be initiated or expanded if funds were available. It was anticipated that the findings from such a study would provide state dental societies with documentation to support the need for increased appropriations from state legislatures and the Association with like justification for supporting the establishment of a dental category in the federal grants-in-aid program. The anticipated findings have been confirmed by the survey.

The Council had found previously that in those states which have the most effective dental divisions and the best dental public health programs, the state societies had actively supported the programs and assisted in procuring the necessary appropriations.[2] Effectiveness of cooperation between the state dental society and the state dental division has been demonstrated further by the survey. The "State Dental Division Program Survey and Cost Estimate Form" developed for the survey by the Council in cooperation with the American Association of Public Health Dentists was completed as a joint effort by the state dental society and state dental division in 46 states and territories, the latter being Puerto Rico and the Virgin Islands. In a few states where the form was prepared by the state dental division, support of the dental society for the proposed expansion of programs on the basis of increased public funds was assured.

HISTORICAL BACKGROUND

Having recognized grants-in-aid as an acceptable method of supporting public health programs "provided that the right of the state or community to adapt any program to its own needs is safeguarded,"[3] the Association has taken steps over the years to bring about the establishment of earmarked federal funds for dental programs. In 1952, the following statement was adopted:[4]

Grant-In-Aid Funds. A historic method for assisting the individual states in the discharge of certain responsibilities to the public will be found in the grants-in-aid made by the federal government. These grants have been utilized for many decades and, by and large, have been established as effective means for attaining specific objectives without impairing the traditional rights of states and communities to determine and administer their own programs.

Grants-in-aid have been made by the federal government for many years for health purposes but it is significant that, at the present time, only 0.4 per cent of the total grants made by the U.S. Public Health Service are allocated to dental programs. Dentistry in many states is not considered as a "basic health service" and thus is automatically deprived of grants-in-aid which are made for basic health services. In order to overcome this difficulty, dentistry should consider the adoption of a program of fostering earmarked funds as has been done successfully for the programs to improve mental health, to procure control of cancer, venereal disease, tuberculosis and heart disease, to treat crippled children and to improve maternal and child health.

Such earmarked grants-in-aid are definitely circumscribed by law to permit the federal government to provide funds to state health departments for a specific purpose, such as the improvement of dental health. In return, the state must submit a written plan which outlines in an acceptable manner the details of the program in which such funds will be spent. A new plan must be submitted each year and thus there is an opportunity for a review of the program and its termination when such action is desirable. [The policy has since been revised. A new plan must be submitted once every two years.]

The House of Delegates of the American Dental Association has long held to the following policy for the improvement of state dental health programs:

> Each of the states should be urged to establish a division of dental health within the department of health, and the administration of the dental program should be in the hands of a qualified dental officer who is directly responsible to the state health officer.

The Association can now advance its program materially by fostering earmarked grants-in-aid to state health departments for dental purposes and by urging the constituent societies to renew their efforts to obtain satisfactory administrative status for the dental unit in the state health department.

In 1953 and 1954, elimination of all special disease grant-in-aid categories, such as the mental health, venereal disease and tuberculosis provisions of the Public Health Service Act, was urged by the then new Eisenhower Administration.[5] It recommended substitution of a general grant-in-aid category, with the states deciding the public health purpose for which the available funds would be used. In view of the Administration's opposition to the entire categorical scheme, the Council on Legislation decided it would be inopportune to press for an additional category. Accordingly, the Council testified in 1953 in favor of the proposed elimination on the ground that state dental divisions would have some chance to obtain federal funds from a general grant source, none under the categorical scheme. With the beginning of President Eisenhower's second term, however, there was no express recommendation for eliminating categorical grants-in-aid, and the program was not discontinued.

In 1956, several state dental societies adopted resolutions calling for the American Dental Association to seek legislation for the establishment of a dental category in the program of federal grants-in-aid to states for general health activities. These resolutions requested further that appropriations to support such a category be sought. The House of Delegates that year referred the following resolution to the Council on Dental Health for action:[6]

> *Resolved*, that the American Dental Association strongly recommends that federal grants-in-aid specifically earmarked for dental programs be made to state health departments, and be it further
>
> *Resolved*, that the American Dental Association actively support this objective through appropriate legislative means.

The Councils on Legislation and Dental Health recognized that accomplishment of the foregoing objective would require extensive effort to win legislative support. It was decided that the Association first should develop:[1]

1. A documented presentation of the present state dental health programs and the need for both immediate and future expansion of current programs

2. Suggestions for cooperative programs for state dental societies and state dental divisions that could be assured of the enthusiastic support of all of the dentists in the state in—

a. Informing state legislators and the public of the benefits of an expanded dental health program

b. Informing Congressmen of the benefits which would be derived from federal funds made available through a dental category.

The 98-item questionnaire "State Dental Division Program Survey and Cost Estimate Form" was the result. It requested information on the extent of current programs and their cost and on new programs that could be developed or existing ones that could be expanded in two years and in five years if funds were available.

METHOD OF TABULATION

Although information was received on 98 program items, it was obvious that consideration of all of them would make for an unwieldy analysis. Some all-inclusive tables would have to be presented to establish proper perspective on the entire state program, but a detailed analysis would not be feasible. Program activities viewed by state dental directors as those of greatest need would be the areas in which an expansion of funds could be expected, so it was decided to determine which these activities were and to concentrate on them. Therefore, the states were arrayed in order of percentage of proposed expansion, from maximum to minimum. The top three percentages were selected within each of the six program areas resulting in 18 items for those states contemplating initiation or expansion within the first year and another 18 for those contemplating initiation or expansion within the second to the fifth years. On consolidation, there was an overlap of three items which reduced the list to 33 items in which initiation or expansion of program might be planned: four in the field of "Program Administration"; six in "Preventive, Diagnostic and Corrective Services"; five in "Program Promotion and Consultive Services"; six in "Public Health Training and Teaching"; six in "Dental Health Education" and six in "Research and Study Projects."

In order to give consideration to the influence of regional location on types of programs undertaken, the United States was divided into four regional areas. Their geographic composition is that used by the National Health Survey in Bureau of the Census surveys and in other studies.

Program data are reported for 43 states; budget and personnel data for 42. Puerto Rico and the Virgin Islands were excluded from consideration, because they could not readily be added to a regional analysis. Program data are included for Vermont, but personnel and budget data could not be extracted from its report. In view of the advent of a new program director in Rhode Island, no expansion was reported in that state. Since its inclusion would, therefore, distort the findings when percentages for the regions were expressed, Rhode Island was omitted entirely.

Personnel and budget data were extracted directly from the individual state returns so that the findings could be expressed on a regional basis. Editing of the returns was held to a minimum, but in some instances, for example, New York and Indiana, the figures were not cumulative and were adjusted to conform with the other state reports before data were consolidated. Additionally, data for the Northeast Region were adjusted arbitrarily to allow for seeming misinterpretation in the completion of findings on expansion in the Connecticut report.

The 43 states included in the tabulation are as follows, by region:

Northeast — Connecticut, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Vermont.

North Central—Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, Wisconsin.

South—Alabama, Arkansas, Delaware, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, West Virginia.

West — California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, Hawaii.

The 33 priority program activities which states have indicated for immediate initiation or expansion follow:

PROGRAM ADMINISTRATION

A1 Liaison and cooperation in dental health matters with other services and units within the State Health Agency (for example, Nutrition, Engineering, Statistics, and so on).

A2 Liaison and cooperation in dental health matters with other official and voluntary organizations and agencies outside of the State Health Agency (for example, welfare, medical and dental organizations, Congress of Parents and Teachers, education organizations, and so on).

A3 Determining and publicizing private practice opportunities in low economic and isolated areas.

A4 Compilation of adequate dental program statistics (for records, legislature purposes, program planning, program evaluation, and so on).

PREVENTIVE, DIAGNOSTIC AND CORRECTIVE SERVICES

B3 Promotional efforts on a local level to encourage the acceptance and adoption of fluoridation of communal water supplies.

B10 Provision of diagnostic services:
—referral programs (for example, inspection, roentgenograms, consultation with students or parents, use of referral cards, and so on).

B12 Dental treatment for the indigent:
—elementary school children.

B16 Dental treatment for those who are:
—homebound.

B17 Dental treatment for those who are:
—in nursing homes.

B26 Dental treatment and rehabilitation of the handicapped:
—provision of treatment for other physically handicapped individuals.

PROGRAM PROMOTION AND CONSULTATIVE SERVICES

C1 Provision of consultative services to local dental programs.

C2 Provision of financial assistance to local dental programs for employment of full-time dental personnel.

C4 Provision of financial assistance to local dental programs to support dental preventive programs.

C5 Provision of financial assistance to local dental programs to support dental educational programs.

C6 Provision of financial assistance to local dental programs to support other dental program elements of local health departments.

PUBLIC HEALTH TRAINING AND TEACHING

D1 Provision of in-service training to state dental staff.

D7 Sponsorship or participation in lectures, seminars, conferences, or workshops in public health or allied subjects for private practitioners:
—nurses.

D8 Sponsorship or participation in postgraduate and short courses in public health or allied subjects (for example, dentistry for children, oral cancer, preventive orthodontics) at college or university level.

D11 Provision of externships or preceptorships in public health for recent dental graduates.

D12 Provision of organized job orientation programs for new personnel.

D13 Teaching dental health in teacher training schools.

DENTAL HEALTH EDUCATION AND INFORMATION

E1 Utilization of newspaper, radio or television or both to acquaint the public with dental health activities within the State.

Table 1 • Per capita expenditures for dental public health and all public health

States	Per capita expenditures		Per cent of all health expenditures devoted to dental health
	Dental public health programs	All public health programs	
United States	.024	2.54	0.9
Alabama	.017	2.00	0.8
Arkansas	.009	1.82	0.5
California	.005	3.05	0.2
Colorado	.028	2.37	1.2
Connecticut	.024	2.35	1.0
Delaware	.046	2.52	1.8
Georgia	.100	3.22	3.1
Hawaii	.031	7.75	0.4
Idaho	.047	2.17	2.2
Illinois	.020	1.62	1.2
Indiana	.016	1.29	1.2
Iowa	.008	1.12	0.7
Kansas	.012	1.71	0.7
Kentucky	.064	2.17	2.9
Louisiana	.012	2.64	0.5
Maryland	.076	3.89	2.0
Massachusetts	.011	2.79	0.4
Michigan	.013	2.44	0.5
Minnesota	.015	1.69	0.9
Mississippi	.011	2.18	0.5
Missouri	.003	2.05	0.1
Montana	.102	1.83	5.6
Nebraska	.010	1.27	0.8
Nevada	.255	3.02	8.4
New Hampshire	.044	1.92	2.3
New Jersey	.015	2.17	0.7
New Mexico	.050	2.55	2.0
New York	.007	4.69	0.1
North Carolina	.055	2.44	2.3
North Dakota	.031	2.21	1.4
Ohio	.004	1.99	0.2
Oklahoma	.031	2.07	1.5
Oregon	.018	2.54	0.7
Pennsylvania	.061	2.45	2.5
South Carolina	.045	2.20	2.0
Tennessee	.069	2.39	2.9
Texas	.006	1.87	0.3
Utah	.038	2.29	1.7
Virginia	.043	3.06	1.4
Washington	.012	2.71	0.4
West Virginia	.011	1.73	0.6
Wisconsin	.008	1.97	0.4

E2 Utilization of newspaper, radio or television or both to increase understanding and knowledge about dental health.

E3 Utilization of films, filmstrips, exhibits and other visual aids to increase understanding and knowledge about dental health.

E6 Preparation and promotion of special dental health "study courses" for PTA or other community groups.

E8 Preparation of education materials for school and classroom.

E9 Organized training of teachers through workshops, seminars, conferences, and so on.

RESEARCH AND STUDY PROJECTS

F1 Surveys to establish the nature and extent of dental diseases and conditions:
—dental caries.

F3 Surveys to establish the nature and extent of dental diseases and conditions:
—malocclusion.

Table 2 • Percentage of States in which there is no activity or inadequate activity in the selected program areas

Program area*	United States	Region			
		Northeast	North Central	South	West
A. Program administration	89	72	87	97	93
B. Preventive, diagnostic and corrective services	98	88	98	100	100
C. Program promotion and consultative services	99	94	98	100	100
D. Public health training and teaching	95	83	98	99	93
E. Dental health education and information	97	81	100	100	100
F. Research and study projects	97	91	100	99	95
Grand total	96	85	97	99	97

*Based on 33 selected program activities.

F5 Surveys to establish the nature and extent of dental diseases and conditions:
—oral cancer.

F9 Surveys to establish total needs of special groups:
—preschool children.

F13 Surveys to establish total needs of special groups:
—the handicapped.

F20 Program evaluation by surveys or other measures for determining the effectiveness or accomplishments of referral programs.

FINDINGS

The figures in Table 1 pose a question. The per cent of all health expenditures budgeted by state health departments for dental health programs in the United States is currently (1958-59) 0.9. By states, this percentage ranges from 5.6 in one sparsely populated area down to 0.1 in two heavily populated areas. Moreover, the per capita expenditure for all

Table 3 • Percentage of States that would initiate or expand program activities in the first year

Program area*	United States	Region			
		Northeast	North Central	South	West
A. Program administration	65	54	57	70	75
B. Preventive, diagnostic and corrective services	48	48	32	54	57
C. Program promotion and consultative services	67	60	68	61	78
D. Public health training and teaching	54	41	50	63	55
E. Dental health education and information	69	52	65	74	78
F. Research and study projects	49	48	47	57	42
Grand total	59	51	53	63	64

*Based on 33 selected program activities.

Table 4 • Percentage of States that would initiate or expand program activities in second to fifth year

Program area*	United States	Region			
		Northeast	North Central	South	West
A. Program administration	18	4	29	23	10
B. Preventive, diagnostic and corrective services	27	14	26	31	32
C. Program promotion and consultative services	21	8	18	30	20
D. Public health training and teaching	31	22	38	29	33
E. Dentral health education and information	24	14	33	24	20
F. Research and study projects	39	24	46	36	47
Grand total	27	14	32	29	27

*Based on 33 selected program activities.

public health programs is two and a half times as much in the latter geographical areas. In the opinion of the Council, it would be reasonable to expect the percentage of total health expenditures made for dental health programs to run about the same, regardless of area; it would be reasonable to expect also that with the availability of increased funds, the percentage would remain approximately the same.

If funds were available, initiation or expansion of all program activities would be undertaken during the first year in 59 per cent of all states, with the percentage increasing to 86 per cent in the second to fifth year (Tables 3 and 4). Addition of percentages in the two tables shows also that 93 per cent of the states would expand "Dental Health Education and Information Programs," thus giving the greatest emphasis to this area. Least emphasis (75 per cent of states) would be given to expansion of "Preventive, Diagnostic and Corrective Services," an observation that should not be surprising since more than half the people presently employed and more than half the funds presently expended are devoted to this program area.

The Northeast and South regions presently employ, on the average, 16 to 17 persons per state as compared with 5 to 6 in North Central and West regions. There is an average expenditure in thousands of $145 by state in the Northeast region, $130 in the South and $45 and $55, respectively, in the West and North Central regions. Analysis of personnel and budget data may demonstrate that the areas that are obviously deficient will still be below par at the end of the five-year period.

Findings for the six program areas will be reported individually, together with general comment on the survey, in Part 2.

1. American Dental Association. Transactions 1958, p. 101.

2. American Dental Association, Council on Dental Health. The state council on dental health program and the support available from the Association. J.A.D.A. 55:112 July 1957.

3. American Dental Association. Transactions 1951, p. 192.

4. American Dental Association. Transactions 1952, p. 35.

5. Conway, Bernard J. Federal grants-in-aid earmarked for state dental public health activities. Presented before 11th National Dental Health Conference, April 25, 1960, American Dental Association, Ambassador West Hotel, Chicago. (Scheduled for publication in J.A.D.A.)

6. American Dental Association. Transactions 1956, p. 203.

A report on what the dental staff can do for the hospital

COUNCIL ON HOSPITAL DENTAL SERVICE

The Council on Hospital Dental Service recognizes that in hospital patient care there is a trend toward offering as complete a health service as is possible with total health care of the individual patient as the objective. Dentists as members of the health team must work cooperatively with hospitals in attaining this objective, and in return have a right to expect reasonable cooperation from all other members of the health team, including the hospital administrative staff.

The following areas of hospital activity in dental practice are presented in the hope that dentists will make every effort to become more effective members of the health professions in the communities in which they serve.

COMPREHENSIVE HEALTH CARE FOR THE PATIENT

A dental service and a dental staff in a general hospital are essential to provide adequate total health care to the patient. If the dental portion of total care is not provided, the hospital is not fulfilling its duty as a service organization to the community. When reference is made to a dental service, all phases of dentistry—preventive, restorative, prosthetic and surgical—are included. These services should be available consistent with the needs of the community and the facilities of the hospital.

There are many ramifications in providing comprehensive health care for the hospital patient. For example, the dental profession is aware that the dental needs of the aging population are an essential part of its total health care. The hospital of today is realizing that in order to give this age group comprehensive health care, the dental aspects are important. In many instances, this group can be cared for only in the hospital environment from the dental as well as systemic health care standpoint. Also, the very young and the handicapped groups are specific instances where dental treatment can be given more adequately in the hospital.

The general practitioners in the community can provide a much needed dental service on an outpatient basis. In many instances, the general practitioner can treat difficult child patients and adults under general anesthesia—services which generally cannot be provided in office practice.

By establishing rapport and active cooperation between physicians and dentists in a hospital, both professions can further the quality of care given to the patients to whom the professions are responsible.

DIAGNOSTIC AND CONSULTATIVE SERVICE

Dentists can carry out a useful role in the diagnostic service. Since many systemic diseases and conditions present oral manifestations, it is difficult to visualize a complete physical survey of a patient without an adequate oral examination. This phase of the complete physical examination can be done best by a member of a qualified dental staff. In addition, the dental staff can become a valuable adjunct to the staff on tumor clinics and rehabilitation services in providing total health care.

The dental staff as an integral part of the hospital care program can render a far greater service to the patient in situations where the oral condition is the primary cause for hospitalization. Further, if the oral condition is associated with a systemic cause for hospitalization, oral disorders are treated at the same time as the primary disorder and the period of confinement is radically reduced.

Consultative services should be widely used. Physicians should welcome the specialized training possessed by the dentist, and likewise, the dentists should welcome the training physicians have in their specialized fields. By sharing the knowledge, in the hospital atmosphere, each profession would contribute greatly to the overall understanding, diagnosis and treatment of the patient.

RESEARCH

Research activities are becoming more and more established as a vital part of staff functions in hospitals. With additional funds available for research facilities, and a greater number of physicians and dentists being trained and qualified to do research, this important phase should be expanded.

There are projects in many areas common to both medicine and dentistry which may be considered. A few are:

1. Birth malformations, for example, cleft lip and palate. In the hospital there is an opportunity to study newborn babies with imperfections and to correlate prenatal findings with natal defects.
2. Hereditary conditions presenting oral manifestations.
3. Cancer detection.
4. Carbohydrate metabolism.
5. Systemic effects of drugs used in dentistry.
6. Epidemiological studies; for example, nutritional studies and causes of periodontal disease.

CONTRIBUTION TO HOSPITAL ADMINISTRATION

Hospital administrators are becoming more and more aware of the importance of dental health service to the general well-being of the patient, and therefore the need of departments of dentistry as a vital health service in the hospital. How then can the dental staff aid the hospital administrator in the broad areas of hospital administration?

The dental staff should take an active part in staff conferences and seminars. Individual members should take an active part in discussion of clinical problems, procedures, and in case presentations. Such cases should be carefully selected for their interest and their value to the entire hospital staff.

Senior dental staff members, because of their training and experience, can be of valuable assistance to the hospital administrator by serving as full members of several committees; for example, on medical records committee, disaster committee, pharmacy committee, training and research committees or credentials committee.

CONTINUING EDUCATIONAL PROGRAMS

The hospital traditionally serves as the continuing educational center for medical interns and residents. Many such educa-

tional training programs are now being carried out in the dental field. Further, the well-organized department of dentistry may be used as a site for teaching dental students. The use of the hospital in presenting a larger portion of the dental school curriculum, the extent of the students' involvement in the hospital routine and his exposure to hospital practices are considerations to be decided by the training committee of the hospital.

The department of dentistry in the hospital provides the proper atmosphere for extended use and training of dental auxiliary personnel. This permits the dentist to perform more dentistry to a rapidly expanding population using hospitals at an increasing rate.

Studies have revealed that graduate nurses generally have received little dental health training. The department of dentistry can provide this training for nurses in training or as a continuing educational process. Such a program would be beneficial to nursing, medicine, dentistry, the hospital and the public. In all hospitals there should be an oral hygiene program in which practical measures of mouth cleanliness should be made part of routine nursing.

The department of dentistry should be used as a center of continuing education in hospital practice for the junior staff members, thus making the younger practitioners more valuable members of the health services family.

The Council is of the opinion that the greater utilization of these areas of hospital dental practice will result in a more widespread acceptance of the contribution of the dental staff in the total health care of the patient.

National Board scores

COUNCIL OF NATIONAL BOARD OF DENTAL EXAMINERS

Of inquiries directed to the Council of National Board of Dental Examiners, significant numbers relate to National Board scores. What do they mean? How are they derived? Both questions can be answered briefly and accurately by stating that the Council uses standard scores. However, a more meaningful explanation of the derivation and meaning of the National Board scores can evolve from a consideration of scores in general.

The National Board Dental examinations yield numerical scores based on the number of items answered correctly on each examination. These numerical or raw scores have little meaning in themselves because the examinations vary in length and because they may vary, to some extent, in level of difficulty. To illustrate this point, a raw score of 78 on a fairly difficult test with 96 questions certainly does not have the same meaning as does a raw score of 78 on an easy test with 82 items. To overcome the differences in the meaning of raw scores with tests of different length, percentage scores could be used. A raw score of 78 on a 96 question test could be reported as 81 per cent; a raw score of 78 on an 82 question test as 95 per cent. These per-

centage scores would be accurate. A score of 81 per cent would mean that the candidate responded correctly to 81 per cent of the items. This is an absolute score, but has little meaning. A score of 81 per cent on an extremely difficult examination is very different from a score of 81 per cent on a relatively easy examination. It is necessary to use relative rather than absolute standards in order to assure uniform meaning of scores in an examination program such as the National Board.

Most standards for evaluating performance relate to group norms, and for this purpose extensive use is made of derived scores. A derived score is a relative score which is derived from a distribution of raw scores. The two most broadly used types of derived scores are percentile ranks and standard scores. A percentile rank expresses an individual's rank as a percentage of the group he surpasses. A percentile rank of 81 indicates that the person surpasses 81 per cent of the group upon which the percentiles are based. A standard score indicates how far an individual deviates from the average, either above or below, in terms of standard deviations.

The Council could have elected to use either percentile ranks or standard scores to report performance on National Board examinations. The percentile rank is more readily understood and more easily computed. However, percentile scores tend to magnify small differences in scores near the average and these differences may not be significant. They tend to reduce the apparent size of large differences in the high and low scores and these differences may be very significant. Also, percentile scores cannot be used in many statistical calculations.

Standard scores, although less readily understood and less easily computed, are increasingly preferred by psychologists and testing experts because differences in standard scores are proportional to differences in raw scores and because standard scores can be averaged and correlated, with the same results as would be obtained from the use of raw scores.

In using standard scores any scale can be assigned to indicate the deviation from the average. In some national testing programs, the value of 500 is assigned to the average and 100 points above or below the average represent one standard deviation above or below the average.

Table 1 • National Board and percentile scores

Distance from average in standard deviations	National Board score	Percentile score
3.0	100	99.9
2.8	99	99.7
2.6	98	99.5
2.4	97	99.2
2.2	96	99
2.0	95	98
1.8	94	96
1.6	93	95
1.4	92	92
1.2	91	88
1.0	90	84
0.8	89	79
0.6	88	73
0.4	87	66
0.2	86	62
0.0	85	50
−0.2	84	42
−0.4	83	34
−0.6	82	27
−0.8	81	21
−1.0	80	16
−1.2	79	12
−1.4	78	8
−1.6	77	5
−1.8	76	4
−2.0	75	2
−2.2	74-F	1
−2.4	73-F	0.8
−2.6	72-F	0.5
−2.8	71-F	0.3
−3.0	70-F	0.1
−3.2	69-F	
−3.4	68-F	
−3.6	67-F	
−3.8	66-F	
−4.0	65-F	
−4.2	64-F	
−4.4	63-F	
−4.6	62-F	
−4.8	61-F	
−5.0	60-F	

Note: A score below 60 on the National Board is rare. Historically it has occurred at the rate of once in each 40,000 individual examinations or about once a year.

Table 2 • Distribution of Part I scores—March 1960

National Board Scores	Normal distribution %	Anatomy %	Microbiology %	Physiology %	General pathology %	Histology %	Biochemistry %
100	.19						
99	.16	.45	.31	.44	.42	.44	.31
98	.27	.32	.31	.25	.19	.26	.22
97	.45	.41	.57	.35	.66	.44	.70
96	.72	.55	.57	.79	.56	.92	.70
95	1.08	1.14	1.29	1.34	.85	.87	1.13
94	1.59	1.23	1.44	.74	1.65	1.87	1.09
93	2.22	1.73	1.13	2.73	2.78	1.74	2.92
92	3.00	3.36	4.47	3.62	3.10	2.40	2.23
91	3.89	3.63	2.98	2.68	2.54	5.54	5.67
90	4.84	4.50	3.39	5.65	5.93	2.79	3.75
89	5.79	6.04	8.23	6.15	6.35	6.15	7.25
88	6.65	5.82	4.01	4.41	4.19	8.11	3.93
87	7.36	7.31	9.77	7.98	10.02	4.10	4.54
86	7.81	8.45	5.35	9.22	4.66	9.90	10.91
85	7.96	8.41	9.67	8.48	9.64	10.16	10.26
84	7.81	8.36	9.98	7.73	9.55	8.07	4.76
83	7.36	8.27	4.99	8.53	4.70	4.71	10.26
82	6.65	6.86	5.25	6.10	7.95	7.94	4.93
81	5.79	3.86	8.08	2.87	6.40	4.14	7.59
80	4.84	4.77	3.39	5.25	4.94	6.15	3.19
79	3.89	4.13	5.97	4.66	4.23	4.10	4.85
78	3.00	3.77	1.49	3.72	2.40	2.05	2.53
77	2.22	2.50	3.24	2.33	2.21	3.40	2.27
76	1.59	1.50	1.44	.89	1.03	.70	1.13
75	1.08	1.04	.93	1.24	1.03	1.53	1.00
74	.72	.36	.57	.50	.56	.26	.39
73	.45	.50	.36	.30	.24	.26	.31
72	.27	.18	.31	.50	.28	.39	.26
71	.16	.23	.36	.15	.09	.26	.39
70	.09	.09	.00	.10	.09	.09	.09
69	.05	.05	.10	.10	.19	.13	.09
68	.03	.09	.05	.05	.14	.00	.17
67	.01	.00		.05	.05	.04	.09
66 & below	.01	.09		.10	.38	.09	.09
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Average	85.00	84.89	84.91	84.99	84.96	84.98	85.00
Failure rate	1.79%	1.59%	1.75%	1.85%	2.02%	1.52%	1.88%

In the Dental Aptitude Testing Program, the value of four is assigned to the average and each point above or below four represents one half a standard deviation above or below the average. In the National Board examination program, the value of 85 is assigned to the average and each point above or below 85 represents two tenths of a standard deviation above or below the average. A score of 85 on any National Board examination means that the candidate's performance was average compared with the other 2,500 or 3,000 candidates who took the examination across the country. A score of 90 means that the candidate's performance was one standard deviation above the average, or that he was in the upper 16 per cent of those examined. If raw scores are normally distributed, and National Board Dental Examination scores are, standard scores may be converted readily into percentile scores for those who prefer this type of reporting.

As indicated in Table 1, a National Board score of 90 is equivalent to a percentile rank of 84. A candidate with a score of 90 ranked above 84 per cent of those examined. A National Board score of 76 is equivalent to a percentile rank of 4. A candidate with a score of 76 ranked above 4 per cent of the candidates examined.

The comment about percentile ranks minimizing differences at the extreme ends of the scales is illustrated clearly in Table 1. If National Board scores were percentile scores or based on percentile ranks, all very low scores would be grouped under the percentile rank of 0.1 or given a score of 70. This means that a candidate would receive a score of 70 even if he did not answer a single question correctly. By using standard scores, the Council avoids this type of distortion. Any score below 75 is considered by the Council as a failure, but the degree by which the candidate failed is clearly indicated by the standard score.

Table 2 presents the actual distribution of Part I scores for the 2,500 candidates examined in March 1960, compared with the distribution which would be produced by a normal curve. This distribution is from a single examination period, but is typical of experience from any testing period. The failure rates on the individual examinations in March varied from 1.52 per cent to 2.02 per cent. Failure rates rarely fall below 1.40 per cent and rarely exceed 2.10 per cent because of the normal distributions of scores produced. The Council has not established a fixed percentage to determine the number of failures. Its regulation specifies that any candidate performing at a level two standard deviations below the average shall be considered as having failed the examination.

The number of candidates failing Part I or Part II examinations is not directly related to the number of failures on individual examinations. It is possible that the failures on each examination would be earned by the same individuals, and the failure rate for the Part would then be about 2 per cent. It is also possible that the failures on each examination would be earned by different individuals and the failure rate for the Part would be 12 per cent (six examinations times 2 per cent failure rate per examination). From actual experience it has been found that there is an overlap. About one third of those who fail one examination fail more than one examination. The failure rate on each Part typically falls between 7 and 9 per cent. The majority of candidates experiencing failures are later reexamined and certified, but there are some who are unable, even with repetition, to meet the standards for certification by the Council of National Board of Dental Examiners.

Information on the purpose, scope and conduct of the Council's program is contained in the brochure, *National Board Dental Examinations*, copies of which are available through the Association's Central Office.

Dentistry on television

BUREAU OF AUDIOVISUAL SERVICE
BUREAU OF DENTAL HEALTH EDUCATION
BUREAU OF PUBLIC INFORMATION

Dentistry has an interesting story to tell the public, and television is an excellent medium for presenting this story. Here is how one dental society produced a series of TV programs on dentistry which was informative, educational and of real interest to the public.

For the last four years, the Greater Milwaukee Dental Association has sent an annual letter to all of the local television stations, requesting their consideration of a series of dental health programs as part of their public service schedule. In 1957 a 15-week dental series appeared on Station WISN in Milwaukee. These programs were more or less of the question and answer type, with some visual aids being used.

In answer to the dental society's general letter in the fall of 1959, officials of Station WITI asked representatives of the society to call on them. It was agreed to try a "different" kind of public service program.

The dental society's board of directors considered seriously whether programs showing actual dentistry would be advisable. The board approved of the idea. Then Max Hoffman, chairman of the Speakers Bureau, Greater Milwaukee Dental Association, began working on the programming.

Three local dental supply houses were asked for equipment, so that a complete dental office could be set up in a studio. This was necessary because there was no room in any actual dental office for all of the cameras and other television equipment needed to film a program. The supply houses made available a dental chair, mobile cabinet, x-ray unit, view box, sterilizer, autoclave, aspirator, air compressor and all the necessary piping and hosing.

A series of six half hour programs was presented, on exodontics, children's dentistry, orthodontics, operative dentistry, periodontal disease and dentures. The series was called "The Inside Story" and was shown over a period of about 3½ months.

A complete script was not written for any of the programs, although the subject to be covered was discussed in advance, and there was an informal rehearsal. The dentist was not required to be an actor; he was effective because he was doing the work he was trained to do. Discussion periods were kept at a minimum or were integrated with demonstrations, leaving most of the time for action and close-up work. Members of the television audience actually saw dental treatment being done in patients' mouths.

In the program on exodontics, an extraction was performed. The emphasis in this program was on the importance of saving teeth by giving them good care

and on the necessity of replacing any teeth that were lost with artificial teeth.

As part of the program on orthodontics, children in various stages of orthodontic treatment appeared. "Before" photographs and roentgenograms of the heads of children with severe malocclusions were shown, and these children, their treatment completed, appeared on the program.

Each program was taped about a month before it was shown. If anything went wrong, a scene could easily be erased from the tape and re-done. There were a few complaints after the showing of the first tapes that the dentists' names were being used too often. Arrangements were made with the studio to introduce the dentist in the first part of the program and thereafter to refer to him only as "Doctor." This seemed to be satisfactory to everyone.

Milwaukee's dental payment plan assisted in promoting the series through posters mailed to local schools, churches, hospitals, physicians, pharmacies, health department and dental offices. About 10,000 posters were mailed.

The Wisconsin State Dental Society gave financial assistance to the Milwaukee society for production of the series. The state society and the American Dental Association purchased films of one of the programs for their film library.

Station WITI gave Class A time for the series as a public service, at a prime hour, 6:30 P.M. on Tuesdays. The society has been told that the time for the series would have cost more than $5,000 for each program if the society had had to pay for it. Total actual cost to the dental society was $551.20.

Thank you letters were mailed to all the participants in the TV programs and to the houses which supplied the equipment. Recently, the dental society sent a letter to the public relations department of one of the larger television stations in Milwaukee referring to the successful series on Station WITI and asking this station to consider the society for its public service time during the coming year.

Fédération Dentaire Internationale: dentistry's international representative

COUNCIL ON INTERNATIONAL RELATIONS

The accomplishments of the Fédération Dentaire Internationale during 1959 and in 1960 prior to the Dublin meeting were evidenced in the reports of the commissions given at that meeting. These reports, five in number, gave positive support to the need of recognizing and considering dental problems at the international level.

Medicine is represented by two international societies, the World Health Organization (W.H.O.) and the World Medical Society (W.M.S.). Dentistry has the Fédération Dentaire Internationale (F.D.I.). Because of the working relationship of the F.D.I. with the aforementioned medical groups, dentistry has been able to plan a course parallel to that of medicine. The result is that each regional area of W.H.O. now has a dental program in some stage of development along with its medical program.

Literally thousands of representative organizations today have international contacts. These organizations represent persons in industry, commerce, health and welfare. Without international contacts, accomplishments would be greatly retarded or stopped completely. The phrase, "the world is getting smaller every day," is vividly exemplified in the rapidity with which we, as dentists, are involved in activities which not too many years ago would have remained as only a national problem.

The Fédération Dentaire Internationale is the only organization representing dentistry at the international level. Its five commissions are studying and reporting on developments in their phase of activity throughout the world. The results are reported annually at the F.D.I. meeting and are of extreme value to all of dentistry and dentists, as well as the public they serve.

In the United States, approximately 1,600 American Dental Association members are supporting F.D.I. activities by becoming supporting members of the Fédération Dentaire Internationale. Annual dues are $15 for which the member receives a membership card and certificate and the quarterly *F.D.I. News Letter* and the quarterly *International Dental Journal*. Qualification for F.D.I. membership is membership in the American Dental Association.

For additional information regarding membership in the F.D.I., write Dr. O. H. Moen, 6 Main St., Watertown, Wis., U.S.A. National Treasurer for the Fédération Dentaire Internationale.

Additions to the Library

BUREAU OF LIBRARY AND INDEXING SERVICE

The books listed here have been added recently to the Bureau collection. Requests for this material, available on loan to all members of the Association, should be addressed to the Bureau of Library and Indexing Service. There is no charge for borrowing books, but there is a minimal charge of one dollar for each package library. Practically all the dental journals published in the world at present are available to members on loan. Lists of books and package libraries are available on request.

BOOKS

AMERICAN DENTAL ASSOCIATION. BUREAU OF AUDIOVISUAL SERVICE. Audiovisual materials in dentistry. Chicago, 1960. 82 p.

ARMED FORCES INSTITUTE OF PATHOLOGY. Manual of histologic and special staining technics. 2d ed. New York, McGraw-Hill, 1960. 207 p. $5.50.

BICK, E. M., ed. Trauma in the aged. New York, McGraw-Hill, 1960. 524 p. $16.

BOLÉO, JOSÉ DE PAIVA. Santa Apolónia; estudo histórico e iconográfico. Lisbon, 1960. 150 p.

CAWSON, R. A. & CUTFORTH, R. H. Medicine for dental students. Boston, Little, Brown, 1960. 212 p. $6.50.

CHERASKIN, EMANUEL. Tooth mobility and glucose metabolism. (*Practical dental monographs*, July 1960.) Chicago, 1960. 30 p.

ECKSTEIN, HARRY. Pressure group politics; the case of the British Medical Association. Stanford, Cal., Stanford University Press, 1960. 168 p. $3.75.

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editorials

Audio analgesia

Within the past year a number of companies have introduced certain types of sound equipment which are purported to produce in patients a state of indifference to pain. This phenomenon is sometimes called "audio analgesia," a term which implies an action whose existence is yet to be established. Sound from a modified tape recorder or phonograph is provided to the patient through earphones. The patient may receive sound of two types, music and masking sound, the ratio and the intensity of which he can control by himself. This masking sound, also called white sound, consists of a mixture of a wide range of sound frequencies which produce a roaring noise sometimes described as similar to that of a loud waterfall. The music ordinarily is varied to suit the choice of the patient. The patient is instructed to increase the intensity of the music or masking sound or both when he feels pain.

Although it is too early to determine whether these devices actually prevent or relieve pain, it is hoped that current research efforts soon will provide part of the necessary information. The clinical reports on these devices have been encouraging, and laboratory studies indicate that there may be a neurophysiological basis for their action. However, the enthusiasm for the phenomenon itself is accompanied by an apparent lack of recognition of the potential hazards involved in the use of these machines. The factor of safety deserves careful consideration, for some of these devices may be capable of causing permanent loss of hearing, either because of misuse or improper design. Both the intensity of the sound and the length of time in which it is applied to the ear are factors which determine the degree of hazard for a given individual. Some people are more prone to auditory damage than others and it is important that a given device is safe for use on even the most susceptible individuals.

The Council on Dental Therapeutics currently is attempting to determine standards by which the safety of each make of device can be assessed. At the present time no such standards are available. Until means are available by which safety can be

determined, these devices may not be advertised in American Dental Association publications or exhibited at meetings sponsored by the Association. This policy is in accordance with rules established by the Association. Practicing dentists may wish to take a circumspect approach to the use of these sound devices on their patients.

National expenditures for dental and several other personal items

Recently THE JOURNAL reported editorially on a few 1960 appropriations made by the federal government for certain essential activities among which was an item of $7,000,000 designated for dental research.[1] The size of that sum in comparison with the billions appropriated for highways and the millions assigned for wildlife service appears to reflect sadly on our national leaders' understanding of the country's dental needs and the urgency of developing, through research, effective, inexpensive methods to reduce those needs.

That this lack of perspective by federal authorities is but the reflection of public opinion and attitude is evidenced by a report recently published by the Survey of Current Business.[2] According to this report the U. S. Department of Commerce estimates that consumer expenditures for dental care in 1959 were $1,963,000,000. Compare that sum with estimated consumer expenditures for other personal items during the same year:

Tobacco products	$ 7,034,000,000
Alcoholic beverages	9,600,000,000
Recreation	18,304,000,000
Personal care	4,661,000,000
Jewelry and watches	2,088,000,000

In short, last year, the American public spent approximately three times as much for tobacco, five times as much for liquor, nine times as much for recreation, twice as much for personal care and an equal amount for personal adornment as for dental health care. Furthermore it must be pointed out that the nation's two billion dollar dental bill by no means met the dental health requirements of the American people, as less than half the population availed itself of dental service during the year.

When the citizens of a so-called civilized nation regard dental care as far less important than many of their other budgetary items, it is perfectly understandable that their representatives in government share the same concept.

If this unfortunate and illogical viewpoint is to be changed, it is up to the dental profession to change it. That means more and better public dental health education beginning in the office of the general dental practitioner and extending through the offices of the local, state and national dental organizations. Only through education can the status of a people or the state of a nation be raised.

1. Funds for research in the fields of health. Editorial. J.A.D.A. 61:492 Oct. 1960.
2. Survey of Current Business. U. S. Department of Commerce July 1960.

Initially speaking: don't abbreviate

The careless habit which many journalists have adopted in recent years of referring to organizations by initials rather than name is often confusing to the reader as well as embarrassing to the organization. A case in point is the use of the initials A.D.A.

Within the dental family these well-known initials stand not only for the American Dental Association but for other dental organizations as well, including our neighbor to the north, the Alberta Dental Association, and the Australian Dental Association at the far end of the globe. Thus, unless the name of the organization is fully spelled out in the opening paragraphs of an article, the reader may be at a loss to know which organization is meant. In this country at least, the indiscriminate use of these initials in the public press is even more confusing as they represent a number of national organizations including the American Dental Association, the American Dairy Association, the American Dietetic Association and the Americans for Democratic Action, a political organization which speaks out on many different national issues.

No doubt there are many dentists who are members of the American Dairy Association and there are some who belong to the American Dietetic Association. Likewise there are some who subscribe to the political beliefs of the Americans for Democratic Action and others who do not. Therefore, as the American Dairy Association recently pointed out,[1] when a news headline states, "A.D.A. Blasts XYZ Program," dairy farmers immediately think that it is their national organization that opposes the measure, dietitians think that it is theirs and dentists think that it is the American Dental Association.

It has long been the policy of American Dental Association publications to use the initials A.D.A. as sparingly as possible, preferring to spell out the complete name of the organization or, if the occasion permits, using the single word "Association." It is recognized that news reporters, and particularly headline writers, face a tremendous problem with some of the long organization names. Nevertheless many readers—dentists included—would be less confused if the initials A.D.A. were used more clearly.

This lack of clearness becomes even more of a problem during periods of political campaigning such as the one in which the nation is now engaged. Some dentists have rightfully become alarmed upon reading that the A.D.A. has indorsed this candidate or that political policy. The American Dental Association indorses no political candidate or no political cause. The Association's only interest in the national scene is in the enactment of legislation that will benefit the health of the American people.

1. Editor and Publisher, Sept. 3, 1960, p. 41.

The Council on Relief raises its sights—please raise yours

Once again the season has arrived to initiate another Relief Fund Campaign. This year, for the first time since 1948, the Council on Relief has raised its goal twenty-five per cent, from $100,000 to $125,000, and increased each constituent society's quota accordingly. The increase, which is several years overdue, has been necessitated by the increase in the cost of living plus a steady and perceptible increase in the number of relief recipients.

Following are excerpts of a request sent by the Council on Relief to constituent and component society officers for aid in putting this year's drive over the top. They are reproduced here as, in the final analysis, their appeal is directed to you and to other active members of the Association.

> A national goal of $125,000. . . .
>
> An average contribution of $5. . . .
>
> These are what the Council on Relief is seeking in the 1960-61 Relief Fund Campaign. . . .
>
> Living costs are rising; relief fund grants are increasing—in number and size. That is why it has become necessary to increase the goal for the first time in the history of the campaigns. Every dollar of every contribution will still be used for relief. All administrative costs, all promotional costs are assumed by the Association. One half of every contribution from your society will be returned to your state relief fund. . . .
>
> In the 1959-60 campaign, only one out of every three active members contributed. If this figure is increased, and the average contribution is $5 we will meet and exceed our $125,000 goal. . . .

Note that last year only one third of the Association's active members donated to the Fund. Considering the worthiness of the cause and the distress experienced by certain unfortunate fellow practitioners, this is not an overly bright picture of generosity or humanitarianism. Try to influence at least two former noncontributors to the Fund to join with you in making this year's Relief Campaign one hundred per cent successful.

international dentistry

News from Great Britain

British Dental Association • Duncan Macgregor, who was formally installed as the new president of the British Dental Association at the annual conference held in Edinburgh last July, made such a forceful presidential address which was widely quoted in the national press that it is, in my opinion, worth devoting most of this article to excerpts from it as follows:

"What is the mission of the dental profession? It is surely to minister to the dental needs of the community and through this to a condition of positive good health in the people.

"Every member of the dental profession should realise that without the activities of the British Dental Association his position today, unsatisfactory though it may be in many respects, would have been a thousand times worse.

"The universities, the dental schools and the General Dental Council together make an imposing facade for a profession with a great mission. What have we achieved?

"It is natural that we should consider the welfare and treatment of children because it is in the earliest years of life and even before birth that the foundation of dental health must be established.

"There we have a failure to report which amounts to a national scandal. The incidence of dental decay is higher than ever, the inspection and treatment of children in local authority schools throughout the country is less adequate than it was ten years ago.

"It is estimated that the minimum proportion of dental officers required is 1 to 3,000 children. At present the average is 1 to 7,000. In many cases there is 1 to 10,000 children. Of the dentists employed nearly 35 per cent are over 55 years of age.

"The service offers no attraction to the young dentists as it is constituted today, and unless drastic steps are taken the situation will rapidly deteriorate.

"It will never help our priority services if conditions are so unattractive that none of the new graduates will enter this sphere of activity as a career.

"It is obviously impossible to increase the output sufficiently in the near future. It is clear also that under present conditions the need for dental treatment will not decrease.

"At present nearly all the energies of the profession are engaged in remedial and repair work on the adult population. Much of this work is sheer waste owing to the unwillingness of people to make regular visits for inspection. This is due to ignorance and can only be cured by systematic inculcation in early youth of the benefits of dental health.

"The profession has been subject from time to time during the last decade to denigration by sections of the press and public which has done much harm. It cannot be too strongly stated that the practitioners faced with an overwhelming demand for treatment by an understaffed profession have deserved nothing but credit from the Government and people of this country.

"There is no doubt that by their efforts tens of thousands of our citizens have begun to realise the advantage of dental attention and conservation of the teeth.

"The worm however is in the bud. The harder the practitioner clings to the high standards and principles of his work, the less he earns; and we are faced with the spectacle of young men at the onset of their careers acquiring an income far in excess of many of their more mature colleagues who, having acquired great skill and knowledge through long experience, devote these riches to their patients' welfare.

"The Report of the Royal Commission sees nothing wrong but rather some merit in this. Nevertheless whatever their opinion, this reversal of the usual climb to success by dint of longer experience and devotion to the practice of our science, spells death to all that is best.

"I have one great fear. Not for ever under the present piece-rate system will our universities and dental schools continue to train young men and women through a curriculum of five or more years to equip them as graduates for the highest ideals in general dental practice when, within a very few years at most, they must discard the best in the pursuit of speed and become mere technical auxiliaries. The inevitable result will be that eventually our universities will train graduates in dental surgery who will in fact be dental surgeons. Either with or without a medical qualification they will be specialists in dental medicine, preventive and children's dentistry, orthodontia, periodontology, and oral surgery. The rest, who will be the successors of the 12,000 highly qualified practitioners of today, will be trained as auxiliaries and paid as such.

"Let us put our house in order before it is too late. The British Dental Association must lead the profession out of its present obsession with costs of items of service and put its feet upon the road to fulfil its true mission.

"Means of prevention must be the subject of intensified research and such schemes as the fluoridation of public water supplies should be proceeded with.

"An alternative system of payment for the general dental practitioner must be found.

1) A per caput system might be possible, but it would be difficult to administer in dental practice.

2) A contributory scheme, which would involve a payment by the State towards cost of treatment on any basis thought suitable, leaving any extra payment to be arranged between patient and dentist.

This it should be stated is still the official policy of the Association. The only obstacle to the establishment of this grant-in-aid is political, and a profession united and determined can do much to achieve the seemingly impossible.

3) Failing this system we must resort to a salaried service carried on in all probability in large well-equipped health centres.

"Why should we be afraid of such a system? It would be a hundred times more ethical, more dignified, more secure, and certainly freer than the present one. I say to you that the present system is the root of all evil.

"Let the British Dental Association conserve the time, energy, and money at present expended on haggling over fees for items of piecework which leaves the profession possibly more prosperous financially but always frustrated, insecure, and unhappy. Let us devote our energies to encouragement of research in the prevention of caries, to dental health education, to the production of a dentally fit adolescent population, to the attainment of a practitioner service which will have persons not things as patients, and which will have dental physicians not automatons as operators."

Fluoridation • Philip R. M. Sutton, Senior Research Fellow in the Dental School of the University of Melbourne, is the author of a book entitled "Fluoridation Errors and Omissions in Experimental Trials." The following excerpts are taken from a review of this book in the *British Dental Journal*.

"There can be few readers who are not aware of the classic epidemiological and experimental studies that showed the relation between dental health and the fluoride concentration of drinking water. Most informed readers will also know that it was on the basis of the results of these studies that several public health authority teams in North America began water fluoridation projects approximately fifteen years ago. These projects, at Branford, Grand Rapids, Evanston, and Newburgh, were designed to explore the technical and administrative problems of supplementing the fluoride in a community water supply. They were also designed to demonstrate that the low incidence of dental caries enjoyed by people living in areas where fluoride was added to the water supply by underground rocks could also be enjoyed by consumers of water supplies to which the optimum amount of fluoride had been added by mechanical means.

"The author of this book does not seem to be aware of this. Ignoring the evidence of epidemiological research and animal experimentation, he has written a monograph beginning with the false premise that the endorsement of proposals to fluoridate domestic water are almost entirely based on the results of the fluoridation trials in the cities mentioned above. He then attempts to suggest to the reader that the trials were so badly designed and conducted and the results were presented in such a prejudiced fashion that they are inadmissible as scientific evidence. He does not arrive at any clear conclusions and his final remark, 'The sound basis on which the efficiency of a public health measure must be assessed is not provided by these five crucial trials,' is nothing more than a carefully phrased innuendo.

"This book is so imperfect that it scarcely merits discussion in a learned journal. However, it may well be publicised by unscrupulous

opponents of fluoridation and for this reason it is necessary to comment upon it in these columns. By the use of guarded language, Dr. Sutton is careful to avoid appearing openly as an opponent of fluoridation but this reviewer's impression gathered from a careful reading of the text is that he is less concerned with scientific truth than with the manufacture of material for a campaign to oppose the introduction of fluoridation in Australia.

"What matters is whether Dr. Sutton's criticisms add up to anything. There are two cardinal errors in the book. One which has already been mentioned is the false premise that the case for fluoridation rests primarily on the evidence of the Grand Rapids, Evanston, Brantford, and Newburgh studies. It does not. It rests on the whole body of evidence which has been obtained primarily from epidemiological survey and animal experimentation. The second serious shortcoming is that the author's analysis is entirely one sided and unfair. None of his criticisms is original or unknown to those responsible for conducting the trials. The questions which should have been answered by an honest critical appraisal of the fluoridation trials are as follows: Was there a significant reduction in dental caries in the test towns as compared to the control towns, or was there not? If there was a reduction was it due to fluoride added to the water supply or to some other causes? Dr. Sutton fails to provide any straight answers to these questions and prefers to take refuge behind a smoke screen of insinuations. In this reviewer's opinion his essay in no way weakens the case for fluoridation.

"All that can be said in favour of the book is that it will encourage the re-reading of the original reports which Dr. Sutton lists in his bibliography. The reader would be well advised to have them at hand and compare them with Dr. Sutton's interpretation. In so doing he will inevitably arrive at the conclusion that the fluoridation project directors and their colleagues are a great deal wiser than Dr. Sutton, and their opinions are a great deal more valued since they are based on first-hand intimate knowledge of the field of study."

Royal College of Surgeons of England • Prof. Rushton has been honored by her Majesty the Queen with the C.B.E., a tribute which has brought great pleasure to his many friends.

At the annual meeting of the Faculty of Dental Surgery held in July, Prof. Martin Rushton was re-elected dean and G. H. Leatherman was elected vice-dean.

History • At a recent meeting of the University Court of the University of Edinburgh, Dr. J. Menzies Campbell was appointed honorary lecturer in the History of Dentistry. This is an appointment of great interest to those interested in the importance of the historical background of dentistry as the foundation of our Profession.

British Dental Journal • In the July 5th issue there started a new series of articles, entitled "The Development and Application of Modern Methods in Cavity Preparation," by G. A. Morrant and R. R. Stephens. The authors are well known for their work in this field, and this series will undoubtedly prove to be of great interest.

G. H. Leatherman,
D.M.D., F.D.S., R.C.S., F.A.C.D.

News from Brazil

Fluoridation • Since September 12 Brazil's new capital city of Brasília has had its drinking water fluoridated. On that day the first of three stations for treatment of community water supply, with a capacity of 60 million liters daily, was inaugurated. This is sufficient to furnish water to a population of 200,000.

A few days later, the city of Campinas in the State of São Paulo, about the thirteenth largest city of Brazil, also began adding fluorine to its community water supply. The cost of this service has been estimated at approximately two million cruzeiros ($10,000) annually.

Conventions and Associations • Several hundred dentists attended the first Dental Convention of the State of Santa Catarina, held in the city of Florianópolis and promoted by the Professional Dental Association of Santa Catarina. Courses in endodontics and cavity preparation were given by guest clinicians.

Professor Arão Rumel, having received a scholarship to study at the University of Pennsylvania, has resigned the presidency of the São Paulo State Dental Association. Antônio de Saraiva Filho will take over this post; Gastão F. Albuquerque Cavalcanti and Hélio de Freitas e Silva moved up to the vice-presidency and the position of secretary-general respectively.

Suggested School Program • At the third ABENO (Brazilian Association of Dental Teaching) meeting, reported on last month,

it was suggested that an efficient university dental course should take at least four years to complete, with the different subjects divided thusly: first year: anatomy, embryology, biochemistry, microbiology and immunology; second year: physiology, nutrition, pathology, pathologic anatomy, pharmacology, restorative dentistry, applied metallurgy and dental materials; third year: removable prosthodontics, endodontics, radiology, anesthesiology and surgery, ethics and legislation, professional economics and legal dentistry; fourth year: fixed prosthodontics, orthodontics, periodontics, pedodontics, hygiene and public health, buccofacial prosthodontics and surgery.

A program for a five year course also was presented, with the suggestion that it be applied only when there is evidence that there is insufficient time and space for a proper four year program.

Scholarships • So far in 1960, ABENO, helped by CAPES (National Campaign for Improvement of University Teaching Personnel), the W. K. Kellogg Foundation and the Point Four program, has sponsored 37 scholarships to Brazilian dental teachers, at a cost of $22,500.

All these scholarships were given to teachers of many different universities and include many different subjects. ABENO-CAPES also gave ten scholarships of $150 each to teachers attending the special course in pedodontics given during July and August in Rio de Janeiro by Sidney B. Finn.

Hans Freudenthal, C.D.

International News in General

COLOMBIA DENTAL SCHOOLS ANNOUNCE FACULTY CHANGES

José Rezk is the new dean of the Facultad de Odontología de la Universidad Nacional de Colombia, Bogotá, replacing Luis Eduardo Argüello, who resigned.

Alberto Arango, formerly secretary of the school, has been appointed dean of the Facultad de Odontología de la Universidad de Antioquia, Medellín, after the resignation of Oscar Javier Restrepo.

José D. Ordóñez has become dean of the Facultad de Odontología de la Universidad de Cartagena, Cartagena, following the resignation of Alfonse Ibarra.

F. H. COMPTON NEW EDITOR OF CANADIAN DENTAL JOURNAL

F. H. Compton, special lecturer in dental public health at the Faculty of Dentistry, University of Toronto, has been named editor of the *Journal of the Canadian Dental Association*. He succeeds Edward R. Bilkey who resigned to return to private practice.

A native of England, Dr. Compton received the degree of B.D.S. from the Royal Dental Hospital of London, University of London. He was a dental intern at the Royal Victoria Hospital, Montreal, and was graduated from the University of Toronto with a D.D.S. degree in 1949. He was granted a diploma in dental public health from the university in 1953.

Dr. Compton has been, from 1954 to 1960, director of the Division of Dental Services, City of Toronto Department of Public Health.

DENTISTS IN SOUTH AFRICA SUPPORT FLUORIDATION

Support for fluoridation of water supplies was voted by the Dental Association of South Africa at its federal council session, March 28-30, 1960, according to the July 15 issue of the *Journal of the Dental Association of South Africa*.

The following motion was adopted: "That this Federal Council Meeting of the Dental Association of South Africa supports the principle of fluoridation of water supplies at the scientific optimum as a health measure and shall pass on this decision to all public health authorities, municipalities, etc., and also the Minister of Health, for their information."

The association rejected an attempt to amend the motion. The amendment would have withheld support for fluoridation "until adequate statistical treatment of all the pertinent factors has been carried out."

OFFICERS NAMED BY PERUVIAN SOCIETY OF DENTISTRY

Óscar Blanco C. has been named president of the Sociedad Peruana de Prótesis Dental y Maxilo Facial, with headquarters in Lima. Other new officers are:

Vice-president, Genaro Acosta; secretary, J. Luís Mogrovejo S.; treasurer, Jorge Leigh R.; librarian, Víctor Málaga; director of the Carta Odontologica, Ricardo Salazar S.; director of the journal, Felipe Plaza, and business manager of the journal, Alfredo Ugarte.

Among those receiving honorary membership in the Swedish Dental Society at its Centennial Congress in August were, from the left, Martin Rushton and Gerald Leatherman of England and Paul H. Jeserich, president of the American Dental Association. Dr. Jeserich is seen shaking hands with Henry Beyron, president of the Swedish Dental Society.

SWEDISH DENTAL SOCIETY HOLDS CENTENNIAL MEET IN STOCKHOLM

Dentists from 29 countries attended the Centennial Congress of the Swedish Dental Society held August 17-20 in Stockholm. The meeting, the largest ever held in Scandinavia, attracted about 2,200 participants.

Essayists and clinicians from all parts of the world participated in the scientific program. The congress was opened by a series of lectures on preventive dentistry as regards caries, periodontics and orthodontics. One series of lectures was conducted entirely in English by Swedish dentists. Symposiums, panel discussions, table clinics and projected clinics were also held.

Among those who were awarded honorary membership in the society during the congress were Paul H. Jeserich, president of the American Dental Association, Gerald Leatherman and Martin Rushton of the United Kingdom, Karl Schuchardt of Germany, and Reidar Sognnaes and Jerome Schweitzer of the United States.

Official delegates to the congress from the American Dental Association were Dr. Jeserich, Harold Hillenbrand, secretary, and Obed H. Moen, president of the Fédération Dentaire Internationale and chairman of the Association's Council on International Relations.

F.D.I. HAS TRAVEL ADVISER IN THE UNITED STATES

Charles W. Carrick, Oberlin Bank Building, Oberlin, Ohio, travel consultant for the United States Section of the Fédération Dentaire Internationale, advises that itineraries for tours in connection with the Helsinki, Finland, annual meeting in 1961 and the International Dental Congress in Cologne, Germany, in 1962 are now ready and available.

Reservations can be made through Dr. Carrick directly or through any recognized agency of the American Society of Travel Agents. This includes American Express, Thos. Cook & Sons, or possibly your own local agent. Even though trips and tours are arranged under other auspices Dr. Carrick will be glad to be of assistance. The arrangement is made possible through the FDI's desire to avoid unhappy situations.

In connection with the Helsinki meeting, which will be held July 9-16, a tour to Russia is being considered, as well as side trips through the Scandinavian countries.

news of dentistry

Patton is new president, Abel president-elect; 17,129 register at busy session in Los Angeles

One hundred and one years of organized dentistry in the United States were climaxed with the installation of Charles H. Patton, an orthodontist from Philadelphia, as president of the American Dental Association. The 1960 annual session was held October 17-20 in Los Angeles. John R. Abel, Beverly Hills, Calif., also an orthodontist, was unanimously chosen president-elect. Dr. Abel is the retiring trustee from the Thirteenth District.

Elected by acclamation were the following candidates: First vice-president, John B. Wilson, Los Angeles, general chairman of the Committee on Local Arrangements for the Los Angeles session; second vice-president, Russell I. Todd, Richmond, Ky.; third vice-president, C. S. Renouard, Butte, Mont., and Speaker of the House, Gerald D. Timmons, Philadelphia. This will be Dr. Timmons' sixth year to serve as Speaker, he announced.

Three trustees were elected by acclamation to succeed themselves for another three-year term. They are: Edward F. Mimmack, Buffalo, Second District; Fritz A. Pierson, Lincoln, Neb., Eleventh District, and John S. Eilar, Albuquerque, N. Mex., Twelfth District. Named to a three-year term was Roger K. Trueblood, Glendale, Ariz., Thirteenth District. Aloyse E. Kopp, Milwaukee, was elected trustee for the Ninth District to serve the last two years of the term of Oswald M. Dresen who died last March. Dr. Kopp had been serving ad interim since Dr. Dresen's death.

HOUSE ACTION

At the opening meeting of the House, the delegates rose to applaud the Washington State Dental Association for its effective program in successfully combatting an initiative proposal to license so-called "denturists."

The House also stood for one minute of silence in tribute to Louis M. Cruttenden, who retired from the employ of the Association last year after 12 years of service as an assistant secretary of the Association. Dr. Cruttenden died August 8. Another member so honored was Maxwell A. Heckler, of New York, who died early in 1960.

Charles H. Patton
President

John R. Abel
President-elect

John B. Wilson
First Vice-president

Russell I. Todd
Second Vice-president

C. S. Renouard
Third Vice-president

American Dental Association
One-hundred and First Annual Session
Newly Elected Officers

Edward F. Mimmack
Second District

Fritz A. Pierson
Eleventh District

Roger K. Trueblood
Thirteenth District

John S. Eilar
Twelfth District

Aloyse E. Kopp
Ninth District

With 410 of its 416 members present, the House:

Resolved that the 1,016 members nominated by the Board of Trustees, in accordance with Chapter 1, Section 20B of the *Bylaws,* be classified as life members;

Approved the election of Mr. Ray Cobaugh, executive secretary of the Pennsylvania Dental Association, to associate membership;

Approved a resolution stating that in presentations to Congress on legislation providing funds for general health programs, the Council on Legislation exercise its own discretion with regard to recommending the earmarking of specified amounts for the dental portions of such programs;

Recommended that the Association continue its membership in and support of the American Thrift Assembly or a successor organization until the 1961 annual session;

Agreed that the Association should support action providing that the director of the Armed Forces Institute of Pathology shall hold the rank of Brigadier General or Rear Admiral;

Turned down a proposal that the Association prepare a brochure to furnish information, advice and guidance for constituent societies relative to the areas which should be covered by a state dental practice act.

Agreed that the professional conduct of members shall be governed by the *Principles of Ethics.*

OTHER ACTIONS

After some discussion on the floor of the House concerning the announcement that the Board of Trustees had chosen Las Vegas, Nev., as the site of the 1965 annual session, the Board instructed voting booths to be set up to solicit the views of the House on this site. The voting was 269 for approving the Board of Trustees' decision and 122 against.

The House by a vote of 279 to 94 rejected a proposal that it rescind the action of the Council on Dental Therapeutics because of the manner in which the Council gave approval to an anti-cariogenic dentifrice; and also rejected a proposal that in the future the Council should not endorse any proprietary preparation without prior approval and concurrence of both the Board of Trustees and the House of Delegates. A resolution proposing that statements of decisions reached by agencies of the Association which affect public opinion should be edited by the Bureau of Public Relations and approved by the Board of Trustees was withdrawn;

Urged the appropriate agencies of the Association to support before Congress those portions of the annual budget appropriation requests of the Office of Civil and Defense Mobilization which pertain to the program of the Division of Health Mobilization of the United States Public Health Service. The House also approved the endorsement of the Family Shelter Program suggested by the federal government and urged all members of the Association to take such measures as will reasonably insure the ability of themselves and families to survive a nuclear attack;

Approved an amendment in one paragraph of the *Basic Standards of Hospital Dental Service* to read as follows: "Included in consultations required under these standards are those required under the rules of the hospital staff. In all cases where the patient is not a good risk and in all cases in which diagnosis is obscure, or when there is doubt as to the best therapeutic measures to be utilized, consultation is appropriate. The consultation note, except in emergencies, shall be recorded prior to definitive treatment";

Rejected a proposal to direct the Board of Trustees to provide funds for the production of a film on dental prosthetics by appropriate agencies of the Association;

Directed the Board of Trustees to make a grant to the Fund for Dental Education with one half of the total sum to be designated to support the program of the

American Association of Dental Schools —the amount of the grant to be determined by the Board of Trustees. (The new Board subsequently appropriated $50,000 from capital funds of the 1961 budget for this purpose);

Rejected a proposal that the Council on Constitution and Bylaws be directed to present for action at the 1961 annual session amendments to the *Constitution and Bylaws* to eliminate the office of the Second Vice-president and of the Third Vice-president and to confer voting powers on the President-elect and the Vice-president as members of the Board of Trustees;

Narrowly defeated a proposal made at the 1959 session by retiring president Percy T. Phillips, to extend voting privileges on the Board of Trustees to all officers of the Association;

Adopted a resolution endorsing the principle that dental societies must have complete control of the editorial and advertising contents of their official publications, and approved a statement drawn up by the Council on Journalism, setting forth "Standards for Dental Society Publications";

Postponed indefinitely action on a proposal to change the age requirements for life membership from 65 years to 70 years;

Defeated a proposal to rescind a resolution adopted in 1959, liberalizing the rules governing the Association's Relief Fund for a three-year period to end in 1962;

Adopted a proposal to amend the Bylaws to eliminate the Council on Membership;

Postponed for one year a directive that after January 1, 1965, members who announce themselves to the public as specialists or as limiting their practices in one of the areas approved by the Association be required to hold a certificate from a national certifying board approved by the Association or a state license permitting announcement in one of the areas approved by the Association, and that the Judicial Council be requested to present an amendment of the *Principles of Ethics* incorporating this change not later than the 1964 annual session, and that the Board be requested to establish appropriate rules for the *American Dental Directory* so that no additional dentists may be designated as specialists in that publication after January 1, 1965, unless they have complied with the requirement of this resolution;

Directed the House to continue to recognize for a reasonable period the following areas of dental practice: oral surgery, orthodontics, pedodontics, periodontics, prosthodontics, oral pathology and dental public health, and to request the national certifying boards of these seven areas of dental practice to present to the Council on Dental Education an acceptable definition of the scope of their areas and evidence that a majority of their diplomates restrict their practices full time to those areas;

Urged accredited dental schools to create or expand programs of experimentation and research in the training of dental assistants and dental hygienists, and approved requirements for the approval of a Certification Board for Dental Assistants as prepared by the Council on Dental Education; further, the House rejected a resolution that the Council give provisional approval to experimental dental assistant training programs of less than one academic year;

Referred to the Council on Dental Education and the Council on Hospital Dental Service for study and report to the House at the 1961 annual session the problem of the adequate training of dentists in anesthesiology in order to practice anesthesiology restricted to dental procedures.

BOARD ACTIONS

The Board of Trustees requested constituent and component societies to study their bylaws with a view to insuring that

there are no provisions which restrict membership on the basis of race, creed or color.

The Board also authorized a contribution of $500 to be given the American Red Cross for the benefit of dentists in earthquake-stricken Chile.

Asserting that there is an urgent need for a short-range program to insure that sufficient qualified persons will enter the study of dentistry and dental hygiene so that available educational facilities will be utilized to the maximum, the Board appropriated $15,000 to join with the American Association of Dental Schools and the Fund for Dental Education in a recruitment program that is already under way.

The Board reported a successful conclusion to the federal grand jury and Department of Justice investigations into the role of dental societies in accreditation programs for dental laboratories, and complimented the members of the Council on Dental Trade and Laboratory Relations for their efforts.

BUDGET

As reported to the House of Delegates in 1958, the budget for the fiscal year 1959 projected an operating deficit in the amount of $100,000. In spite of exceptional expenses because of the celebration of the Association's centennial, the deficit at December 31, 1959, amounted to only $25,877.91.

The Board reported an excellent financial situation for the current fiscal year to August 31. The budget for the past fiscal year did not appropriate $318,125 of anticipated income and the Board, in keeping with its 1959 commitment to the House of Delegates, placed $250,000 of this sum in the Reserve Division in September. At the end of the fiscal year, the balance of the operating surplus for 1960 also will be placed in the Reserve Division.

Estimated total income for 1961 is $3,493,000, an increase of $144,600 over 1960. Agencies of the Association made appropriation requests totaling $3,433,566 for the next fiscal year. The Board made reductions in the budget askings to produce an expense estimate of $3,334,277, which would enable the contribution of $158,723 of unappropriated income to the Reserve Division.

Of the budgeted expenses as recommended by the Board, $981,944 is for administration, $128,795 for the annual session, $533,870 for Bureaus and departments, $826,120 for Councils and divisions, $713,548 for publications and $150,000 for the contingent fund.

Income from membership dues is expected to be $2,340,000; from advertising and subscriptions to Association publications, $525,500; earnings on investments, $125,000; exhibit space rentals, $150,000; sale of educational materials, $110,000; from the Council on Dental Education's Division of Educational Measurements, $87,000; from the Council of the National Board of Dental Examiners, $133,000; from the Bureau of Library and Indexing Service, $2,000, and miscellaneous, $2,000.

PUBLIC HEALTH

The House urged that all agencies concerned with interscholastic athletics make mandatory the wearing of properly fitted, individually fabricated mouth protectors by members of school football teams and those engaged in other body contact athletic activities during practice sessions and games, and requested the appropriate agencies of the Association to encourage the implementation of this project.

GENERAL MEETING

A general meeting was held in the Ballroom of the Statler Hilton Hotel, session headquarters, Monday forenoon, October 17, to inaugurate the one-hundred and first annual session.

President Paul H. Jeserich called the meeting to order and introduced guests

who were seated on the platform. They included representatives of international and national dental societies, health and related U. S. organizations and various dental groups.

Participants in the session were welcomed to Los Angeles by Mayor Norris Poulson and to California by Governor Edmund G. Brown.

Greetings were extended by Leonard L. McEvoy, president of the Los Angeles County Dental Society; Robert W. McNulty, president of the Southern California State Dental Association, and John B. Wilson, chairman of the General Committee on Local Arrangements.

Principal speaker was Dr. Lee A. DuBridge, president of the California Institute of Technology. Dr. DuBridge compared the achievements of the United States and the Soviet Union in space exploration and missile competition.

"As far as intercontinental missiles are concerned," he said, "there is no technological gap of significance since our Atlas and Titan missiles are quite adequate to carry our best thermonuclear warheads to any possible enemy target."

However, he declared, we cannot deny the existence of a "space lag." The Russians use much larger booster rockets than the United States, which enables them to launch larger space vehicles and to send them farther into space. Dr. DuBridge indicated that the chief value of this to the Russians lay in its psychological influence on the people of other nations.

PRESIDENT'S REPORT

In his report to the House of Delegates at the opening meeting of the 1960 session, the outgoing president, Paul H. Jeserich, said that the chief barriers to the promotion of the art and science of dentistry are complacency and defective public relations.

In urging that all dentists interest themselves actively in the profession's affairs, he noted that dentistry "does not reflect itself to our society through its national leaders nearly as much as it does through those who work in the communities, particularly the practitioners who actually are the link with the people the profession is dedicated to serve."

He pointed to American dentistry's world leadership in research as one way in which the public is served and said when new facts are uncovered, "they must be pressed into service as quickly as possible in clinical dentistry if the gap between research and prevention and treatment is not to grow greater."

Dr. Jeserich said he was disturbed "at the reaction of some dentists and some members at the recent action of an agency of the Association in recognizing the effectiveness of another weapon in the control of dental caries—the stannous fluoride dentifrice." He traced the years of careful study and scrupulous consultation that led the Council on Dental Therapeutics to bestow the recognition.

"No profession, worthy of the name," he said, "has the right to withhold information with such a direct bearing on health merely because it runs counter to present opinion or dismisses some of our present prejudices."

While declining to recommend specific courses of action, Dr. Jeserich cautioned urgently against resisting change just because it is change, and asked that none in the profession "blind themselves to the needs of the public and the profession in a changing era."

"The future," he concluded, "will need men of courage and vision, who dare greatly and dream greatly for the fulfillment of their rights, and above all, men who make their work catch up with their dreams."

NEW BOARD

The new Board of Trustees met immediately after the close of the final session of the House of Delegates. The Board:

Reaffirmed its decision to hold the 1965 annual session in Las Vegas;

Approved the following dates for the

three regular sessions of the Board of Trustees in 1961: spring session, March 19-21; summer session, August 24-26; annual session, October 16-19;

Confirmed the designation of Obed H. Moen as the national treasurer of the Fédération Dentaire Internationale for the United States for the term ending with the 1961 annual session;

Elected the following delegates to the FDI for 1961: Obed H. Moen, John R. Abel, Charles H. Patton, Gerald Timmons, and Harold Hillenbrand. The 1961 meeting of the FDI will be held July 8-15 in Helsinki, Finland;

Named Alfred E. Smith of Louisiana as the representative on the policy-making body of the American Thrift Assembly for the term ending with the 1961 annual session;

Appointed Victor H. Levitz, Jay Eshleman and Howard F. Lyboldt delegates to the National Health Council for terms ending with the 1961 session;

Designated President Patton, Harold Hillenbrand and Mr. Bernard J. Conway as representatives to the Joint Council to Improve the Health Care of the Aged for terms ending with the 1961 annual session;

Picked the following to represent the Association on the Inter-Association Committee on Health for the term ending with the 1961 annual session: President Patton, President-elect Abel, Kenneth Easlick and Harold Hillenbrand;

Appointed the following to serve as chairmen of their respective Councils: C. M. Taylor, Texas, Constitution and Bylaws; Leslie M. FitzGerald, Iowa, Dental Education; R. W. Openshaw, Southern California, Dental Health; W. F. Swanson, Pennsylvania, Dental Research; Floyd D. Ostrander, Michigan, Dental Therapeutics; J. Eugene Ziegler, Southern California, Dental Trade and Laboratory Relations; Thomas F. Powers, New Jersey, Federal Dental Services; O. J. McCormack, New York, Hospital Dental Service; Harold M. Flickinger, Arkansas, Insurance; Carl L. Sebelius, Tennessee, International Relations; Isaac Sissman, Pennsylvania, Journalism; C. E. Rutledge, California, Judicial; Matthew Besdine, New York, Legislation; Harry Blechman, New York, National Board of Dental Examiners; H. R. Bleier, Wisconsin, Relief, and Jarvis Williams, Missouri, Scientific Session.

The Board decided that the Special Committee on the Women's Auxiliary of the Association be continued until the 1961 annual session with the following personnel: Edward F. Mimmack, chairman, William Garrett and Maynard K. Hine.

SCIENTIFIC SESSION

Essays, clinics, forums, table clinics and motion pictures were presented daily throughout the meeting at the new Sports Arena in Los Angeles. Registration for the 1960 session was 17,129, making this the best attended annual meeting of any in the Association's history with the exception of the Centennial Session in New York last year. Of the registrants, 8,789 were Association members.

Winners in the Student Clinic Program were announced at a reception for participants in the scientific session given Monday, October 17. First place was won by Martin J. Dwyer, Temple University School of Dentistry; second was Arthur H. Tsutsui, Howard University College of Dentistry, and third went to Raymond G. Dennison, New York University College of Dentistry. They received checks for $300, $200 and $100 respectively.

Judges for the student program were Paul A. Dewhirst, Los Angeles; Charles S. Kurz, Carlyle, Ill., and Robert V. Walker, Dallas.

Winners of Certificates of Honor in the scientific exhibit were:

Individual Dentist Category • William P. Humphrey, Denver, "The Use of Chrome Steel in Dentistry for Children"; Wil-

liam R. Harkins and Cloyd S. Harkins, Osceola Mills, Pa., and John F. Harkins, Wesleyville, Pa., "Prostheses for Congenital and Acquired Cleft Palate Individuals"; Jacob C. Lifton, New York City, "Treatment of Congenital and Acquired Cleft Palate Anomalies Ranging from Age 5 Days to 74 Years."

Institutions, Associations and State and Local Governments • Department of Oral Surgery, University of Illinois College of Dentistry, "Local Anesthetic Technics"; University of Kansas City School of Dentistry, "The Role of Inflammation in Periodontal Disease"; Memorial Center for the Treatment of Cancer and Allied Diseases, New York City, "Maxillofacial Prosthetics and Mouth Cancer"; Pennhurst State School, Spring City, Pa., "Congenital Abnormalities and Their Oral Manifestations."

Federal Agencies • U. S. Air Force, Office of the Surgeon General, "USAF Dental Research and the Man in the Space Program"; National Bureau of Standards, American Dental Association, "Dental Research at the National Bureau of Standards"; U. S. Navy Dental Corps, "U. S. Navy Dental Corps."

Commercial Agencies • Professional and educational services, Colgate-Palmolive

Pictured at the President's Banquet October 19 at the Biltmore Hotel in Los Angeles are, from the left, President-elect John R. Abel and Mrs. Abel; President Charles H. Patton and Mrs. Patton, First Vice-president John B. Wilson and Mrs. Wilson and Harold Hillenbrand, Association secretary.

Company, "Toothbrushing Instructions in the Primary Grades."

Judges of the scientific exhibits were Walter J. Monia, Beverly Hills, and William W. Wainwright, Canoga Park, Calif.

Association Affairs

CONGRESSMAN DECRIES LACK OF CIVIL DEFENSE PLANNING

Failure of the Federal government to develop an adequate nationwide plan for civil defense was deplored by Rep. Chet Holifield (D., Calif.) at the Second National Civil Defense Conference October 15 in Los Angeles.

The Conference was presided over by Thomas F. Powers, chairman of the Association's Council on Federal Dental Services, sponsoring agency. The welcoming address was given by Charles H. Patton, president of the Association.

Congressman Holifield said, "The facts concerning the effect of a possible nuclear war and the enormous saving potential of an effective civil defense program are well known to our national civil defense officials. There is no lack of information on the part of the Office of Civil and Defense Mobilization, but there is a glaring lack of preparation. The administration has refused to take the steps necessary to meet these requirements.

"The present administration policy is that the state and localities must shoulder the burden of civil defense operations. The federal government, it is said, should confine itself to providing 'leadership, guidance and example', together with limited matching funds for certain state and local activities."

Congressman Holifield made it clear that he believed the same lack of action would prevail regardless of which political party was in office. Foremost in importance in any adequate civil plan, according to the Californian, is a nationwide shelter construction program, organized and implemented by the federal government, instead of the current "suggestions" put forth in the National Health Plan which leaves the entire responsibility for protection and survival in the event of nuclear attack to the individual family head.

The scope of health services in an emergency were described by Carruth J. Wagner, M.D., chief, Division of Health Mobilization of the United States Public Health Services. Dr. Wagner said, "In health mobilization in time of emergency we must base our operational plans upon the resources that are actually available rather than wistfully planning what we would like to have to do the job in an ideal manner. By basing the plan upon what is actually on hand, we have the capability to go into operation immediately if necessary. In the meantime, we can persist in our efforts to increase our capability by adding to our resources.

"If we direct our attention to the operational survival plans of our states and communities and work within the organization they provide, we will all make significant contributions to the welfare of the country."

Rear Admiral Curtiss W. Schantz, chief, Dental Division, Bureau of Medicine and Surgery, U. S. Navy, and Captain Herbert J. Towle, Jr., head, department of audiovisual training, Naval Dental School, National Naval Medical Center, outlined the casualty treatment training program of the Navy Dental Corps by means of slides, motion pictures and displays.

ADVANCED INSTITUTE ON HOSPITAL DENTAL SERVICE

The first Advanced Institute on Hospital Dental Service will be held November 29-December 1. Sponsored by the Association's Council on Hospital Dental Service and the American Hospital Association. The sessions will be held at the latter's

headquarters in Chicago. The Institute will be preceded by the third Conference on Graduate Training November 28 by the American Society of Oral Surgeons.

The hospital in the total health program with emphasis on dental care will be discussed by J. Ted Howell, M.D., associate director, Henry Ford Hospital, Detroit. Mr. John M. Danielson, administrator, Evanston Hospital, Evanston, Ill., and Fred Lucchesi, chief of the dental service of Philadelphia General Hospital, will speak on hospital professional staff organization. Establishing a dental service and inservice training for a dental staff will be explored by Saul Levy, dental director, Michael Reese Hospital, Chicago, and James Griffin, chief of the department of dentistry of Charlotte Hungerford Hospital, Torrington, Conn.

The second day's sessions will be on the relationship of group purchase programs for dental care to hospital dental practice, professional audit and utilization of dental service, interprofessional relations, physical facilities—planning and equipment, and demonstration of physical facilities with exhibits. Speakers will be Mr. Richard Jones, secretary, Blue Cross Commission of the American Hospital Association, Fred Henny, chief, division of oral surgery, Henry Ford Hospital, Joseph H. Anderson, M.D., assistant director, department on professional practice, American Hospital Association, Leland Weyer, dental director, division of dental resources, U. S. Public Health Service, Mr. Herbert Hollweg, architect with the Public Health Service and Herman Smith, M.D., hospital consultant, formerly administrator of Michael Reese Hospital.

On the final day of the Institute, Dr. Levy and John Zur, deputy director, Illinois Department of Public Health, Division of Dental Health, will talk on the extension of hospital dental service to the outpatient department, and Frank W. Wentz, chairman of the periodontics division, Loyola University School of Dentistry, will speak on the importance of oral tissues in the early detection of systemic diseases.

The sessions will end with a summary and critique of the Institute, given by Morgan Allison, chairman of the department of oral surgery of Ohio State University School of Dentistry.

JACOBS GETS GIES AWARD; KIT FOR EDITORS AVAILABLE

Ascher L. Jacobs, Chicago, received the William J. Gies Foundation editorial award, October 15, for his editorial entitled "Dentistry and Apathy." The editorial appeared in the April 1959 issue of the *Illinois Dental Journal*, of which Dr. Jacobs is associate editor. Bissell B. Palmer, New York City, president of the Gies Foundation and one of the founders of the American Association of Dental Editors, presented Dr. Jacobs with a plaque and an honorarium of $200, at a dinner in the Statler Hilton Hotel, Los Angeles. The dinner climaxed an all-day meeting sponsored by the American Dental Association's Council on Journalism and the American Association of Dental Editors.

Earlier, Lon W. Morrey, editor of the American Dental Association, had received the 1960 distinguished service award of the AADE.

Dr. Morrey presided at the business meeting of the AADE the morning of October 15. In his presidential address, Dr. Morrey urged the association to revise its bylaws to provide for rotating membership on its committees, to facilitate long-range planning.

"The American Association of Dental Editors has the opportunity to be of the greatest value to the American Dental Association and the dental profession," said Dr. Morrey.

Miss Belle Fiedler, Appleton, Wis., editor of the *Journal of the American Dental Hygienists' Association*, succeeded Dr. Morrey as president of the AADE.

Movie and television star Bob Hope was awarded a plaque honoring him for his activities in advancing dental health education for children. Dr. Jeserich is shown presenting the award to Hope at the President's Banquet.

House of Delegates

EVENTS AT THE 1960 SESSION IN LOS ANGELES

Speaker of the House Gerald Timmons shown in action at the House opening meeting, doing a take-off of Nikita Khrushchev.

Delegates are seen at the polls just outside the Ballroom where the House met. They are expressing their views on the subject of holding the 1965 annual session at Las Vegas.

1960 Annual Session

Dr. Lee A. DuBridge, left, president of the California Institute of Technology and principal speaker at the opening meeting, is seen with President Paul H. Jeserich of the Association.

David J. Fitzgibbon, Washington, D. C., chairman of the Council on Scientific Session (right), presents check to Martin J. Dwyer, Temple University School of Dentistry, for winning first place in the Student Clinic Program. Watching were Raymond G. Dennison (left), third place winner, of New York University College of Dentistry, and Arthur H. Tsutsui, Howard University College of Dentistry, second place winner.

According to tradition, past presidents meet for a luncheon during the annual session. Seen seated at the table at the left are Harry Lyons, Daniel F. Lynch, Otto Brandhorst and Harold Oppice. Sitting in rear from left are Clyde E. Minges, Leroy M. S. Miner, Frank M. Casto, and continuing to right of picture, C. Willard Camalier, Oren A. Oliver, LeRoy M. Ennis, William Alstadt, H. B. Washburn, Bernerd C. Kingsbury, Percy T. Phillips and Leslie M. FitzGerald.

Other officers elected are: president-elect, J. C. Almy Harding, San Diego, Calif.; vice-president, Sidney Epstein, San Francisco; secretary-treasurer, Elmer Ebert, Chicago, and editor (re-elected), Ralph Rosen, St. Louis.

The AADE now has 123 publication members, 5 student publication members, and 142 active and associate members, it was announced. The association represents 84 per cent of the constituent dental journals, 87 per cent of the component journals, and 78 per cent of the fraternal and school journals.

John Oppie McCall, New York City, was elected to honorary membership in the AADE.

Miss Fiedler presided at the afternoon session. Victor Hall, University of California Medical Center, Los Angeles, spoke on "The new look in science writing," and Robert Cutting, Pacific Press, Inc., Los Angeles, discussed modern magazine editing. Bruce Douglas, editor of the *Okayama Medical Journal,* discussed his experiences in the past year while teaching as a Fulbright exchange professor of oral surgery at the Okayama University Medical School, Okayama, Japan.

A revised editor's kit has been compiled and is available to constituent and component dental societies, Mrs. Velma Child, secretary of the Council on Journalism, announced. The kit, which includes a copy of "Medical Writing" by Morris Fishbein, is priced at fifteen dollars.

Dr. Harding presided at the evening session. Gerald D. Timmons, dean of the School of Dentistry, Temple University, Philadelphia, spoke on "Communication: editors and educators share a common problem." The dental editor should provide a pipeline of communication, said Dean Timmons. "State dental societies don't support their editors adequately," he said. "When a state society finds a good editor, it should compensate him. State societies should train editors," he concluded.

NEW LIST OF PACKAGE LIBRARIES ISSUED BY BUREAU

The Association's Bureau of Library and Indexing Service has prepared a list of dental books published between January 1957 and September 1960, and a list of the package libraries available, together with instructions for the procedure to be followed in ordering any of these.

Members are entitled to borrow any of these as well as any of the current dental journals published in the United States and abroad that can be acquired. There is no charge for borrowing books, but the rental fee of one dollar for each package library should accompany requests.

The new listing, *Books and Package Libraries for Dentists,* is available free of charge on request to the Bureau at the Central Office.

ARTHUR MERRITT CONTRIBUTES TO LIBRARY COLLECTION

Arthur H. Merritt of New York City, past president of the Association and past president of the American Academy of Dental History, has donated the sum of $200 to the Association's Bureau of Library and Indexing Service for the purchase of historical books on dentistry.

Dr. Merritt, an ardent collector and dental historian, last year donated a substantial sum to the Library for the same purpose. He is the holder of many awards and honors for his contributions to the dental profession, has held many offices in dental societies and is the author of a textbook on periodontal diseases and many articles on dentistry.

AID ASKED OF DENTISTS VISITING AUSTRALIA

The Association has been asked to advise any of its members who plan to travel to Australia to call the editor of one of the Brisbane newspapers if he is qualified and interested in the subject of fluoridation. Howard Robertson, a dentist in

Brisbane, writes that Mr. John F. Wakefield of the *Telegraph*, Brisbane, is interested in hearing from any dental scientists who may happen to be in that city and who might wish to have their views on fluoridation published. The telephone number is Brisbane 32-0101.

RADIO PROGRAMS AND SPOT ANNOUNCEMENTS PREPARED

Recordings of four 15-minute dental health education programs and of 20 spot announcements are being given to constituent dental societies by the Bureau of Dental Health Education. The programs and spot announcements are intended primarily for use on radio.

The Bureau is sending each constituent society one or more sets of the recordings, depending on the size of membership of the society. The constituent societies are being asked to arrange to make the discs available to component societies on a loan basis.

The four 15-minute programs have been recorded on two discs (one program on each side), and the spot announcements are on one side of one disc. All three records are 16-inch, 33⅓ rpm.

Titles of the four programs are "Freddy's Story" (deciduous teeth), "The Case of Warren Kirby" (orthodontics), "Don't Forget Those Eskimos" (diet and other aspects of dental health) and "The Shorts of Stories" (value of the smile). There are ten 15-second and ten 30-second spot announcements.

Many societies may wish to ask their local radio stations to broadcast the programs and spot announcements during National Children's Dental Health Week. However, all are suitable for use any time during the year.

Each of the programs may be played on only one radio station and only once in any one community. However, they may be used without restriction for schools, service clubs, P.T.A.'s and similar groups.

Additional copies of the records may be rented from the Bureau of Audiovisual Service. Records also may be purchased from the Order Department for $4.50 each.

BUREAU PRODUCES LEAFLET ON ORAL PROPHYLAXIS

"An Ounce of Prevention," a new leaflet produced by the Bureau of Dental Health Education, explains why an oral prophylaxis at regular intervals is an important part of preventive dental care.

Many doctors find that their patients do not understand why dentists advise that everyone's teeth be cleaned regularly. A dentist can save time by giving copies of "An Ounce of Prevention," rather than an oral explanation, to patients.

This is an excellent leaflet to enclose with recall cards. Its size is 5½ by 3 inches.

Prices of "An Ounce of Prevention" are: (25) $0.50; (50) $0.85; (100) $1.00; (500) $7.00. Prices for larger quantities may be obtained from the Order Department. Orders should be sent to the Order Department, American Dental Association, 222 East Superior St., Chicago 11.

INTERNATIONAL LUNCHEON AT ANNUAL SESSION

About ninety dentists from 22 countries were honored October 18 at an international luncheon. Brief greetings were extended by Obed H. Moen, Watertown, Wis., president of the Fédération Dentaire Internationale; Paul H. Jeserich, president, and Harold Hillenbrand, secretary, of the American Dental Association. Don Gullett, secretary of the Canadian Dental Association, responded for the visitors.

Dr. Hillenbrand announced that friends from Latin America would be particularly welcome at the 1962 session of the American Dental Association, Oct. 29-Nov. 1, in Miami Beach, Fla. The

Obed H. Moen, Watertown, Wis., president of the Fédération Dentaire Internationale and chairman of the Association's Council on International Relations (third from left), shows international guests at the annual session points of interest on a map of Los Angeles. All the dentists except Aldie Aldus of Holland (far left) are from Switzerland. They are (from left) M. Fisch, Lisa Cavin, Helen Koller, H. A. Koller, Erich Jahn and Paul Reber.

Association's 1964 session in San Francisco would be held concurrently with the meeting of the Fédération Dentaire Internationale in that city, he said.

Dentists from the following countries were present at the luncheon: Australia, Brazil, Canada, Colombia, Denmark, Ecuador, El Salvador, England, Finland, Guatamala, Honduras, India, Korea, Japan, Mexico, Philippines, The Netherlands, Norway, Spain, Switzerland, Venezuela and the Virgin Islands.

DENTISTS INVITED TO JOIN SCIENCE ASSOCIATION

As members of an affiliate of the American Association for the Advancement of Science, members of the American Dental Association are invited to join and lend their support to a large organization that represents, and works for, all science. For the annual dues of $8.50, each AAAS member receives *Science* every week. Among its regular features are editorials, news items, lead articles, research reports, book reviews, equipment news and letters. Membership also brings advance notice of the programs of the annual meeting and permits purchase of AAAS symposium volumes at reduced rates. The offices are at 1515 Massachusetts Ave., N.W., Washington 5, D. C.

Dental Societies

STATE SOCIETY OFFICERS DISCUSS "DENTURISTRY"

The threat of illegal dental practice was the major subject of discussion at the Fortieth Conference of State Society Officers, held October 16 in the Statler Hilton Hotel, Los Angeles, in connection with the annual session of the American Dental Association. The conference was the first held in two years, no meeting having been held in 1959 because of the many special events accompanying the Centennial Session of the American Dental Association in New York. The conference will hold its 1961 meeting in Philadelphia.

Carl V. E. Cassel, St. Paul, secretary of the Minnesota State Dental Associa-

tion and conference president, presided.

The successful fight of the Washington State Dental Association against the "denturist" proposal was discussed by George D. Dore, Jr., Seattle, president-elect of his association.

"The initiative and referendum process are only two aspects of the legislative process with which association officials should become familiar," said Dr. Dore. "Simply stated, 'initiative' refers to legislation introduced by the electorate. 'Referendum' is concerned with legislation referred to the electorate for approval or disapproval . . . both measures have a useful purpose. They may be of great value to the profession in that in states where such measures are available, they would enable the dental profession to 'check-mate' undesirable legislation passed by an uninformed or unfriendly state legislature and refer it to the people for determination following a campaign of information. . . .

"Those opposing dentistry—whether it be the anti-fluoridationist, the 'denturist,' or some other group unknown at this moment—will use every technic possible to achieve their goals. The dental profession must become 'experts' in all technics, if we are to meet these attacks.

"We must prepare detailed campaigns where necessary and as 'professionals in dentistry' we should recognize and utilize 'professionals' in legislative activity to assist our program. . . .

"No state, whether it be industrial or rural; whether it be predominantly one political party or another, or whether it have a dense population or a thinly scattered population, can afford to sit back and state. 'It can't happen here.'

"In Washington," concluded Dr. Dore, "our success in defeating initiative 206 [the 'denturist' proposal] before it reached the ballot was largely due to the fact that the Washington State Dental Association is not only interested in legislation, it has a continuing and experienced program in this important field. Our committee members and staff are experienced and capable. This is one task that is not delegated to 'outside' part-time assistance, but is carried on by our own full-time organization. We have not only an association program, but outside the association dentists and auxiliary groups are organized on a state legislative district basis as a Legislative Interest Committee of the Dental Profession. In conjunction with the WSDA, this committee carries on a nonpartisan program with local legislators."

Others to discuss aspects of illegal dental practice were: Fritz A. Pierson, Lincoln, Neb., secretary of the Nebraska Dental Association and Trustee, Eleventh District, American Dental Association; Mr. Bernard J. Conway, Chicago, assistant secretary, legal affairs, American Dental Association; J. Eugene Ziegler, Los Angeles, chairman of the Association's Council on Dental Trade and Laboratory Relations, and Don W. Gullett, Toronto, secretary, Canadian Dental Association.

"Good public relations is good performance publicly appreciated," said Dr. Pierson. "Some type of public relations should be pursued by every dental society."

Dr. Gullett told the conference that only a third of the population in Canada receives dental care in any one year, the demand for dental care being greatly in excess of the supply.

"There has been a sharp increase in appreciation of dental service," he said. "This need is going to be met—if not by the profession, then by the government. The solution does not consist entirely in increasing the number of dentists. We are rapidly entering an age when the recipients of health service are going to have much more to say about how they are going to get those services."

The greater use of dental auxiliaries is one way to bring down the cost of dentistry to the public, asserted Dr. Gullett.

HOLDER ELECTED PRESIDENT

Thomas D. Holder, Portland, Ore., secretary-treasurer of the Oregon State Dental Association, was elected conference president to succeed Dr. Cassel. Others elected are: vice-president, Alvin B. Coxwell, Jr., Louisville, secretary-treasurer, Kentucky Dental Association, and secretary, Hal E. Leyland, Tampa, Fla., executive secretary of the Florida State Dental Society. The nominating committee was headed by Mr. Ray Cobaugh, Harrisburg, Pa., executive secretary, Pennsylvania Dental Association.

The conference voted to extend the term of office of its secretary to three years, to facilitate long-term planning.

The conference closed with a buffet luncheon.

NEW YORK SOCIETY STUDIES SPONSORED PAYMENT PROGRAMS

Five problems associated with the development and operation of dental society sponsored programs for the group purchase of dental care were subjects of a conference conducted recently in New York City by the committee on dental care for groups of The Dental Society of the State of New York.

They were: communication with membership; standards for programs for groups; standards for operating agreements with Blue Cross and Blue Shield agencies; position of dental societies in over-all development of dental care coverage through service corporations and the insurance industry, and professional agencies to serve best as technical adviser to legislative bodies in the promotion of sound legislation.

Participants agreed that the New York Dental Service Corporation can offer a variety of plans aimed at preventive periodic care which will be as comprehensive as the finances of the group seeking benefits will allow and with adequate remuneration to the dentists. They also concurred that counsel for the dental society should be designated as the person best suited to serve as technical adviser to legislative bodies.

Herbert L. Taub, Brooklyn, chairman of the society's committee on dental care for groups, was general chairman of the conference.

National Defense

MORE CIVILIANS CAN ATTEND NAVY CASUALTY COURSES

Capt. A. R. Frechette, Deputy Chief of the Navy Dental Division, announces that the number of spaces allocated to the Association for attendance by civilian members at the Casualty Treatment Training Courses presented by the Navy Dental Corps has been increased from one to two.

The following schedule of courses has thus far been programmed for 1961: United States Naval Dental School, Bethesda, Md., April 10-14; United States Naval Dental Clinic, Norfolk, Va., February 6-10, May 8-12, July 24-28 and November 13-17.

Association members wishing to attend any of these courses are asked to contact Mr. Herbert Lassiter, secretary of the Council on Federal Dental Services, at the Central Office.

ARMED FORCES MEDICAL JOURNAL TO DISCONTINUE

Publication of the *U.S. Armed Forces Medical Journal* will cease with the December 1960 issue of the magazine. For the past ten years the monthly journal published medical, dental and technical articles from the Services, current information about the Services, and a monthly letter from the American Medical Association. Announcement of the discontinuance of the magazine was made by Frank B. Berry, M.D., Assistant Secretary of Defense.

Dental Education

L. C. ALEXANDER APPOINTED DENTAL DEAN AT MARQUETTE

Leonard C. Alexander, former professor of oral medicine and director of postgraduate education in the School of Dentistry, Marquette University, has taken office as the new dean of the school.

L. C. Alexander

Dr. Alexander has been serving as chairman of an administrative committee for the school since the death of Dean Oswald M. Dresen last March 26.

A graduate of Marquette's dental school, Dr. Alexander was appointed to the university faculty in 1947 as a specialist in endodontics. He has been chairman of the endodontics department since 1948.

Dr. Alexander is a Fellow of the American College of Dentists and served as secretary of the Wisconsin section for seven years. He is also a member of the American Association of Endodontists as well as local, state and national dental societies.

FUND FOR DENTAL EDUCATION REPORTS ON FIRST FULL YEAR

In the first full year of its operation, 1959, the Fund for Dental Education has received contributions of $136,509.95 from 50 individuals, corporations and foundations, Maynard K. Hine, president, has announced.

During 1959 the Fund made allocations and grants as follows: three teaching fellowships in anesthesiology, periodontology and pedodontics to future dental teachers studying at the universities of Pittsburgh, Alabama and Indiana; to the American Society of Oral Surgeons to hold a Planning Conference on Graduate Training in Oral Surgery; to the University of Oregon to sponsor the first Conference and Seminar on the Teaching of Dental Economics and Practice Management, held on the West Coast; special restricted grants to five dental schools; a grant to the American Association of Dental Schools to hold the first conference of dental deans on the subject of dental school administration; a grant for a two-day conference on the Teaching of Dental Materials, held at Northwestern University, and a grant toward the production of the American Dental Association's Centennial motion picture, "Pattern of a Profession."

Although the Fund has not gone directly to the members of the dental profession for contributions, since many of them are now making annual gifts to their dental schools, an encouraging number of dentists are making contributions which may be restricted for the use of a certain school or may be made for over-all programs of the Fund, Dr. Hine said. Some dentists have begun sending memorial contributions to the Fund in lieu of sending flowers on the occasion of the death of a colleague, patient or friend.

Offices of the Fund for Dental Education are located at 840 N. Lake Shore Dr., Chicago 11.

TELEVISION STATION DONATES TO N.Y.U. DENTAL COLLEGE

New York University College of Dentistry is the recipient of a gift of $10,000 from television station WOR-TV to complete construction of a closed circuit television operation initially established at the school. Mr. Hathaway Watson, vice-president in charge of broadcasting for

RKO General, made the presentation to Dean Raymond J. Nagle in September.

In presenting the gift, Mr. Watson said, "It is our hope that this gift will help develop closed circuit television at the College of Dentistry as a powerful adjunct in dental education."

Dean Nagle, in accepting the gift on behalf of the college, said, "There is no question that closed circuit TV is to become an important part of the educational program of the dental college. Our closed circuit television operation will enable us to reach hundreds of dental students simultaneously in different parts of the building. With the advances of television technics, we can project the most minute examination of many dental problems, the most intricate surgery, or experimental work and at the same time enable all students to participate intimately in the actual happening."

INTERNSHIPS AVAILABLE IN NEW YORK CITY HOSPITALS

A rotating internship to begin in July 1961 is available at Grand Central Hospital, New York, with rotation to Morrisania City Hospital, Bronx. Application can be made to Bernard M. Cohen, director, department of dentistry, Grand Central Hospital, 321 East 42nd St., New York.

A surgical internship at Morrisania City Hospital also is available for July 1961. Both programs are accredited by the American Dental Association Council on Dental Education.

INTERNSHIPS, RESIDENCY AT MOUNT SINAI IN NEW YORK

The Dental and Oral Surgery Service of The Mount Sinai Hospital in New York City announces that it is accepting applications for internships and a residency for the calendar year beginning July 1, 1961. Max Fuchs, assistant director, announces that application should be made as soon as possible as selections generally are made in December. The address is 11 East 100th St., New York 29.

Ralph W. Malone

REAR ADMIRAL MALONE GIVEN FULBRIGHT SCHOLARSHIP

Rear Admiral Ralph W. Malone, DC, USN, (retired), former assistant chief of the Bureau of Medicine and Surgery (Dentistry), and chief, Dental Division, has been awarded a Fulbright Grant sponsored by the Office of Educational Exchange, United States State Department. He will serve as special lecturer in prosthodontics at the School of Dentistry, University of Cairo, United Arab Republic.

HOSPITAL INTERN, RESIDENCY PROGRAM IN IOWA CITY

The Veterans Administration Hospital, Iowa City, Iowa, in affiliation with the State University of Iowa College of Dentistry, announces that two rotating dental internships and one residency in prosthetics will be available for the year beginning July 1. Application material and information can be obtained from the chief of the dental service of the hospital.

SCHOOLS OFFER WIDE VARIETY OF POSTGRADUATE COURSES

Alabama • The following courses will be offered at the University of Alabama School of Dentistry during the month of January: general anesthesia (limited to diplomates of the American Board of Oral Surgery or members of the American Society of Oral Surgeons),

January 7-9, James D. Jones and Charles A. McCallum; crown and bridge prosthodontics, with emphasis on pontic construction and fused porcelain veneers, January 20-22, John F. Johnston; oral roentgenology, January 28-30, Arthur H. Wuehrmann.

Further information can be obtained from the director of the refresher course program, University of Alabama School of Dentistry, 1919 Seventh Ave. S., Birmingham.

Albert Einstein College of Medicine • The Department of Dentistry of the Albert Einstein College of Medicine of Yeshiva University announces the following postgraduate courses: anesthesiology, premedication, comedication and supportive therapy, April 6 and 7, Stanley R. Spiro and associates; anesthesiology, preoperative and preanesthetic evaluation technics, June 9, Stanley R. Spiro and associates; endodontics, February 22-24, Julius Fox and associates; dento-alveolar surgery, May 4 and 5, Herbert Calman, Stanley J. Behrman, William Rakower and associates; oral pathology and general practice, March 24 and March 31, Ernest Baden; periodontics, ten Wednesdays beginning March 1, Marvin N. Okun, Irving Yudkoff and associates; prosthodontics, Friday mornings, March 3, 10, 17, 24 and 31, Lester E. Rosenthal and Max A. Pleasure.

The university is located at Eastchester Rd. and Morris Park Ave., Bronx 61, New York.

Boston • The department of stomatology, division of graduate studies, School of Medicine, Boston University, and the Massachusetts Memorial Hospitals announce the following postgraduate courses: periodontal pathology, January 16-21, Henry M. Goldman and Jack Bloom; oral pathology for oral surgeons, March 6-10, Jack Bloom, Kurt Thoma, Henry M. Goldman and staff; apicoectomy, surgical endodontic procedures, April 10-14, Herbert Schilder; periodontal therapy, April 24-29, Henry M. Goldman, Bernard S. Chaikin, Gerald M. Kramer, William Pendergast, Jack Bloom and associates; advanced course in periodontal therapy, April 24-29, Henry M. Goldman, Bernard S. Chaikin, Gerald M. Kramer, William Pendergast and associates; full mouth reconstruction, May 15-19, Leo Talkov, David J. Baraban, Henry M. Goldman, Bernard S. Chaikin, Gerald M. Kramer and J. David Kohn; surgical procedures in periodontal therapy, May 22-26, Lewis Fox and associates.

Week-end refresher courses at the same school are: esthetics in complete dentures, January 6 and 7, Eugene Tillman; tumors in oral surgery, January 13 and 14, Kurt Thoma and Henry M. Goldman; clinical pathology of the oral mucous membranes, January 20 and 21, Max Jacobs and Henry M. Goldman; evaluation of newer dental materials and technics, and factors affecting their clinical success, January 27 and 28, R. W. Phillips; treatment planning clinic—restoration of missing teeth, February 17 and 18, staff; one-day review of endodontic procedures, February 25, Herbert Schilder; selection of cases and technics for minor tooth movement, March 3 and 4, Leonard Hirschfeld; applied anatomy of the head and neck, March 10 and 11, Arthur M. Lassek; seminar: review of occlusal concepts in restorative dentistry, March 17 and 18, Morton Amsterdam, Ernest R. Granger, Edward J. Hoffman; the abutment tooth, March 24 and 25, staff.

Further information can be obtained by writing to the director of postgraduate courses of the department of stomatology, Massachusetts Memorial Hospitals, 750 Harrison Ave., Boston 18.

California (Los Angeles) • The University of California Extension Dental Program, Los Angeles, will present the following program for November and December: the dynamics of oral diagnosis, November 9, 16, 23, 30, Frank Howell; fixed bridgework, December 2, 3, 4, 9, 10, 11, Donald Smith; full mouth rehabilitation waxing technic, December 9-11, Peter Thomas; endodontics, January 19-21, Paul K. Hill; demonstration course for complete dentures, January 11-13, Victor Sears; general refresher course (State Board Review Course), some time in April, staff.

Further information can be obtained by writing to J. Eugene Ziegler, head, Extension Dental Program, 815 South Hill St., Los Angeles 14.

California (San Francisco) • The University of California San Francisco Medical Center has listed three special courses for January and February. They are: clinical occlusion in the natural dentition, January 9-11; successful dental practice utilizing effective administrative procedure, January 20 and 21; orthodontic principles in general dental practice, February 3 and 4.

New York • The periodontics and oral medicine department of New York University College of Dentistry will give a six session course on temporomandibular joint dysfunction and its treatment, by Sidney E. Riesner and Earl O. Butcher, Monday, Wednesday and Friday beginning January 9. The course will cover the anatomy and physiology of the joint. Pain symptoms, pathological disturbances, the role of dental occlusion, masticatory habits and psychogenic factors involved in the syndrome will be analyzed. Methods of therapy by drugs and occlusal equilibration technics will be ex-

amined. The utilization of stereoroentgenography for diagnosis will be demonstrated. The school is located at 421 First Ave., New York 10.

Pennsylvania • The following courses are being offered by the University of Pennsylvania School of Dentistry: dentistry for handicapped children, December 12-14, Manuel M. Album and associates; seminar on handicapped problems, December 15, Manuel M. Album and associates; hypnosis applied to dentistry, January 16-18, William T. Heron; prosthetic relations of the temporomandibular joint, January 16-20, Ernest R. Granger and associates; impacted teeth, January 25-27, Victor H. Frank and associates; cephalometry, January 30-February 1, Viken Sassouni; applied anatomy, February 22-24, Harry Sicher; partial dentures, February 27-March 3, M. M. DeVan and associates. Further information can be obtained by writing to: Postgraduate Courses, School of Dentistry, University of Pennsylvania, 4001 Spruce St., Philadelphia 4.

Seton Hall • Two refresher courses for 1961 have been scheduled by Seton Hall University College of Dentistry. They are: occlusal equilibration, January 16 and 17, Nathan Allen Shore, and the complete management of the endodontics patient, 11 Wednesdays beginning February 1, staff and visiting lecturers. Applications should be sent to the dental postgraduate division of the school at Medical Center, Jersey City, N. J.

Temple • Three postgraduate courses using closed circuit television and high-speed equipment are listed by Temple University School of Dentistry. They are: high speed in operative dentistry, December 7, Carlos Weil and Charles A. Nagle; implant dentures, January 9-13, Aaron Gershkoff and Norman I. Goldberg; anatomy—head and neck dissection, Wednesdays from February 1 through May 17, Richard M. Snodgrasse. Further information can be obtained from the school at Broad above Allegheny Ave., Philadelphia 40.

Toronto • A special course in radiology will be held March 13-17 by the University of Toronto Faculty of Dentistry. The course will be directed by H. G. Poyton and will include seminars by G. C. Hare, G. A. Morgan and C. H. M. Williams, and guest lecturer H. M. Worth. Application forms and further information can be obtained by writing to the chairman of the division of postgraduate studies of the Faculty of Dentistry at the school. The address is 124 Edward St., Toronto, Ontario, Canada.

Washington • A refresher course in the principles of crown and bridge planning and fabrication will be given December 2 and 3 by John D. Guthrie and Kenneth N. Morrison at the University of Washington School of Dentistry, Seattle.

General

SURVEY OF DENTISTRY SUMMARIZED AT SESSION

Recommendations concerning dental care for children are chief among those proposed by the Commission on the Survey of Dentistry in the United States. A summary of the results of the Survey, conducted for the past two years and three months, was given Sunday at the fortieth annual convocation of the American College of Dentists by members of the Survey staff.

Don W. Gullett, president of the College, explained that the Survey was undertaken at the instigation of the profession because it wanted suggestions for improvement and not because there was anything particularly the matter with the profession or the practice of it.

The project was directed by the American Council on Education and financed by grants from the W. K. Kellogg Foundation, the Rockefeller Brothers Fund, the Louis W. and Maud Hill Family Foundation and the American Dental Association.

The Commission proposes a gradual increase in outlay of capital expenditures for dental schools, support of these schools, fluoridation of water supplies, care for school children and dental research from the present 45 million dollars per year to about one billion dollars per year by 1972. Largest item in the breakdown of these figures is dental care for children. The Commission estimates that this would cost $120,000,000 the first year, for the first cohort of some 4,000,000 six-year-olds at the rate of $30 each based

on the needs of six-year-olds at average costs. After that the cost would increase gradually over 11 years, leveling off at an annual total of a little over $940,000,000 for the twelfth and succeeding years.

This recommendation is based on the proposal that states and local communities design and initiate incremental care programs for children, covering six-year-olds the first year and adding new groups of six-year-olds each year until all children through high school are covered.

Among the many other recommendations made by the Commission was one that dentists utilize a greater number of well-trained dental assistants, that state practice acts provide for the widening of duties of auxiliary personnel—specifically, that dental hygienists and dental assistants be trained to apply topical fluorides under the dentist's supervision—and that the number of schools for assistants be increased.

The Commission further recommends: that all states accept the results of the National Board Examinations in lieu of their own written examinations, and that every effort be made to improve the quality of state board examinations by ensuring the appointment of well-qualified dentists to the examining boards;

That, consistent with high standards, present schools be expanded and new schools constructed to permit the graduation of at least 6,000 dentists annually by 1975;

That a national recruitment be established to attract better students and that the admissions standards of dental schools be reviewed for the purpose of improving the quality of the students admitted; that more full-time dental teachers be employed, and that financial support for dental research be increased.

The proposed completed program for the five aforementioned areas of dentistry, is based on a projected population of the United States of over 222 million in 1972.

Other staff members and the areas of their studies and recommendations presented at the meeting were Robert Kesel, dental practice and dental research; William R. Mann, dental education, and Wesley O. Young, dental health.

The complete report of the Survey is expected to be available by February 1.

KELLOGG FOUNDATION GRANT TO DENTAL HYGIENE PROGRAM

A grant of $94,250 to aid in the establishment of a dental hygiene program has been awarded Westbrook Junior College, Portland, Maine, by the W. K. Kellogg Foundation of Battle Creek, Mich.

Westbrook will be the first residential junior college in the country to offer this highly specialized program. It is expected to receive national attention from educators and specialists in dental auxiliary training.

President Edward Y. Blewett announced that according to present plans the new program, eighth in the major divisions of study of the college, will be in operation by the fall of 1961. The two-year curriculum will lead to a degree of Associate in Applied Science.

At its June meeting the Maine Dental Society gave its endorsement to the establishment of a dental hygienist course in Maine and at that time offered its cooperation and support of such a program at Westbrook Junior College.

WILLIAM J. GIES FOUNDATION FURTHERS DENTAL PROFESSION

The William J. Gies Foundation for the Advancement of Dentistry, Inc., was founded in 1950 as a permanent tribute to Dr. Gies for his outstanding and effective devotion to dentistry. It was conceived and organized by dentists and is administered by them exclusively for the advancement of dentistry. Its officers and directors serve without pay.

The Foundation invites dentists, dental schools and various other dental institutions and dental periodicals from every

section of the United States and Canada to apply for grants to aid projects related to the broader aspects of dental research, education, literature, nonproprietary dental journalism, dental socioeconomics, dental public welfare, dental organizations and interprofessional relationships.

Donations to the fund are also invited to assist in the carrying out of its program. All contributions are income tax deductible and, in accordance with a provision of the charter, are assigned to capital funds. Unless otherwise specified by the donor, only the income therefrom may be expended.

The Foundation offices are at 221 Park Ave. S., New York 3. Officers are: president, Bissell B. Palmer; honorary president, Arthur H. Merritt; vice-president, John P. Traugott; secretary-treasurer, Alfred L. Kohn; directors, Percy T. Phillips, George C. Paffenbarger and Alfred J. Asgis.

AMERICAN DENTAL CLUB OF PARIS ASKS FOR SPEAKERS

Dentists from the United States who would serve as essayists or present table clinics at the meetings of the American Dental Club of Paris, France, are asked to communicate with the club's president.

The club meets on the first Thursday of each month from October through June and is composed largely of dentists who have studied in American schools. All meetings are conducted in English.

Interested dentists are asked to write to Robert Goldstein, 70 Avenue Marceau, Paris 8.

ORAL BIOLOGY INSTITUTE HAS CASE HISTORY SERVICE

The American Institute of Oral Biology is continuing to offer its case history service for the fiscal year 1960-61 (through September 30). This includes original 35 mm. color slides of pathologic findings, medical background, roentgenograms, photomicrographs, diagnostic criteria and whatever else may be indicated in each case, with a general discussion of the disease. A loose-leaf binder and matching slide box also are furnished.

The subscriber to this case history service is entitled to full membership in the institute. Members of the American Dental Association or the American Medical Association, or their foreign equivalents, are eligible to apply. Complete series for the years 1954-59 are still available; the 1952 and 1953 series are out-of-print.

Further information can be obtained from the secretary, Mrs. C. Novembri, 2240 Channing Way, Berkeley 4, Calif.

WORKSHOP IN NUTRITION AND PREVENTIVE DENTISTRY HELD

The Eastman Dental Dispensary, Rochester, N. Y., was the setting for a two day workshop last month in nutrition and preventive dentistry. The conference was held for teachers of these subjects in the dental schools, and was supported by The Nutrition Foundation, the National Vitamin Foundation and the American Chicle Company.

Basil G. Bibby, director of the Eastman Dental Dispensary, was chairman, and Abraham Nizel of the Tufts University School of Dental Medicine summarized the results of the workshop. Conclusions arrived at during the conference will be made available to the profession in the near future.

DENTISTS AID AUTHORITIES IN IDENTIFYING PATIENT

The "News of Dentistry" section of the September issue of THE JOURNAL carried a news item referring to a request from authorities of Patton State Hospital, Patton, Calif., that members of the Association aid in the identification of a woman patient who could not or would not identify herself. Hospital authorities state that many readers supplied them with information and that the patient has been identified.

ANTIFLUORIDATIONIST SUED FOR DRUG VIOLATIONS

Royal Lee, president of the Vitamin Products Company and the Lee Foundation for Nutritional Research, Milwaukee, Wis., and a noted antifluoridationist, was sued September 28 in federal court in Milwaukee for alleged violation of the federal food, drug and cosmetic act.

He is charged with 15 counts of sending various drugs, together with false and misleading printed matter, through interstate commerce to firms in Oakland, Calif., and Cincinnati.

The printed material said one drug was "effective for prevention and treatment" of 72 diseases. The products included vitamin wafers, various vegetable compounds, a vitamin F liniment for skin disorders and several types of nutritional supplements.

PROSTHODONTICS BOARD CHOOSES NEW OFFICERS

At the annual examination meeting of the American Board of Prosthodontics held in July at Georgetown University School of Dentistry, the following officers were elected for the ensuing year:

President, Alvin H. Grunewald, Chicago; vice-president, Bertram H. Downs, Colorado Springs, Colo.; secretary-treasurer, Charles H. Jamieson, Detroit. Raymond J. Nagle and Daniel H. Gehl retired as Board members and Lynn C. Dirksen, chairman, prosthetic department, Emory University, was elected to membership on the Board.

The next meeting of the Board will be held August 14-19, 1961, in Chicago.

PSI OMEGA FRATERNITY OPENS NEW CENTRAL OFFICE

Psi Omega Fraternity announces that its central office is now occupying new quarters at 829 Land Title Building, Broad and Chestnut Streets, Philadelphia 10. Carl M. Graul, executive secretary, and Edward M. Grosse, supreme recorder, work out of this office, to which all inquiries concerning the fraternity should be directed. Announcement also is made that Roy F. West of Seattle has completed his term as supreme councilor from Province 1 and that the new supreme councilor from Province 1 is Stewart Everson of Los Angeles.

ORTHODONTISTS OPEN CENTRAL OFFICE, SEEK EXEC. SECRETARY

The American Association of Orthodontists has established a central office at 225 South Meramec Ave., St. Louis 5. The office currently is being conducted by Secretary Earl E. Shepard with the aid of Assistant Secretary Mrs. Pat Kerr.

At the recent annual meeting of the association in Washington it was resolved that a secretary of administrative or executive stature be employed to head this office. Members who may know of a qualified person who is active and aggressive, with a knowledge of running a business office and an understanding of public relations, are urged to have him contact the secretary at the afore-mentioned address.

S. RUSH HAVEN TAKES POST WITH FLORIDA STATE BOARD

S. Rush Haven has become the executive director of the Florida State Board of Dental Examiners, Jacksonville. Dr. Haven retired March 31, 1960 on completion of more than 30 years' active service in the United States Army, his last assignment being Dental Surgeon, Headquarters Second United States Army, Fort George G. Meade, Maryland. His new address is P.O. Box 2913, Jacksonville 3, Fla.

1960 State Dental Association Presidents

Wallace C. Mayo is the president of the Florida State Dental Society. He is a graduate of the University of Florida and of Emory University School of Dentistry (1937). A periodontist in Pensacola, Dr. Mayo has held all offices of his state society, and all offices in the Northwest District Dental Society of Florida. In 1956 he was president of the Southern Academy of Periodontology and a delegate from Florida to the American Dental Association's House of Delegates. He is a member of the American Academy of Periodontology and the Fédération Dentaire Internationale.

He is a member of the Exchange Club, the First Baptist Church, the Chamber of Commerce and the Pensacola Yacht and Country Clubs. He is the author of an article, "Bloodied but Unbowed," in the January 1960 issue of the *Journal of the Florida State Dental Society*.

Dr. Mayo is married and the father of three children, Donna Jean, 13, Susan Wallis, 12, and Clair Edith, 2. He is interested in boating and water sports, is an inspector examiner of the U.S. Coast Guard Auxiliary, is a private pilot, served with distinction in the U.S. Army from 1941 to 1946 in the African and European theaters, and is a member of the dental staff of three hospitals.

Herman R. Wenger, a general practitioner in Chicago and a graduate of Northwestern University Dental School, is president of the Illinois State Dental Society. Married, President Wenger has one daughter, Mrs. Eleanore Wenger Darnall.

Dr. Wenger has served on various committees of the Chicago Dental Society and was general chairman of the 1956 Midwinter Meeting. He has served the Illinois State Dental Society for many years, on the public policy and bylaws committees, on the commission on legislation and law enforcement, and as councilman, treasurer, and a delegate to the American Dental Association's annual sessions.

Charles G. Sanner is president of the Iowa Dental Association and a general practitioner in Dubuque. Dr. Sanner received his D.D.S. from the State University of Iowa School of Dentistry in 1918, and his B.A. from Loras College, Dubuque, in 1922. He has served as secretary and president of the Dubuque District Dental Society, and is a Fellow of the American College of Dentists. Dr. Sanner also holds membership in the American Legion and in Elks Lodge 297. Dr. Sanner is a bachelor. His hobbies are amateur aviation, amateur radio and horseback riding.

Wallace C. Mayo
Florida

Herman R. Wenger
Illinois

Charles G. Sanner
Iowa

William C. Draffin
South Carolina

Ireatus D. Johnson
New Mexico

Clifford C. Gregory
New York

William C. Draffin, a general practitioner in Columbia, S.C., is the president of the South Carolina Dental Association. He attended the University of South Carolina from 1935 to 1937, the Atlanta Southern Dental College from 1937 to 1939, then transferred to the Medical College of Virginia School of Dentistry from which he received the D.D.S. degree in 1941. He is a member of the Columbia Dental Society, of which he served as president in 1950, the Richland County Dental Association, and has served as vice-president and president of the Central District Dental Society.

Dr. Draffin is a past-president and member of the Columbia Executive Club. He is a member of the Columbia Torch Club, Columbia Quadrille Club and the Brotherhood of St. Andrew. He was married to Margaret Leray Connell in 1941; they have three children—William Craig Draffin, Jr., 10, David Scott, 8, and Rosalee Leray, 5. Dr. Draffin's hobbies are hunting, fishing and church work.

A lifelong resident of Columbia, he won athletic honors in high school and college. He served in the U.S. Air Force from 1943 to 1946, becoming a major. He is a member of the vestry of Trinity Episcopal Church. He served four years on the advisory commission to the City Board of Health, has been active in the County Health Department clinic for indigent children and in other civic enterprises.

Ireatus D. Johnson, a general practitioner in Clovis, is president of the New Mexico Dental Association. He graduated from the College of Dentistry of the State University of Iowa in 1928.

Dr. Johnson served as president of the New Mexico State Board of Dental Examiners in 1954, as president of the Eastern New Mexico Dental Society in 1956, and as vice-president of the New Mexico Dental Association in 1958. He is a member of the American Denture Society and the Pierre Fauchard Academy, and a member of the Lions Club.

Dr. Johnson is married and the father of two sons, Darrel W. and Robert E. Dr. Johnson has extensive farming interests and raises registered quarter horses. He plays golf and collects rare books on the history of the West.

Clifford C. Gregory, a general practitioner in Oneonta, N.Y., is president of the Dental Society of the State of New York. He graduated from the University of Pennsylvania Dental School in 1930. He has served his state society as a member of the board of governors, as chairman of the constitution and bylaws council, and as a delegate to the House of Delegates of the American Dental Association. Dr. Gregory was president of the Sixth District Dental Society in 1930. He is a member of the Pierre Fauchard Academy, Elks, Masons, Rotary International, vice-president of the local chapter of the National Foundation, and a Fellow of the American College of Dentists.

Dr. Gregory is married and the father of two sons, Peter B. and Melvin C.

He is chief of the board of directors of the First National Bank in Sidney; his hobbies are photography and the collection of antiques. He is a member of Delta Sigma Delta, Eta Sigma Sigma, and Omicron Kappa Upsilon dental fraternities.

Dentistry in Great Britain 1859-1959: Some facts on its past and present and thoughts on the future

Gerald H. Leatherman, D.M.D., F.D.S., R.C.S., F.A.C.D., London, England*

The history of dentistry shows it existed in times long past, for there is evidence in the earliest writings that it was a branch of medicine.

Charles Allen's *Curious Observations on the Teeth,* printed in 1687, is the first recorded English book on dentistry. The first course of lectures on dental surgery in Great Britain was delivered by William Rae, deacon of the Incorporation of Surgeons of Edinburgh.

John Hunter was the first man in England to introduce lectures on teeth to his students; he made a scientific study of the teeth and published a book, *Natural History of the Human Teeth,* in 1771.

In the nineteenth century Sir John Tomes did much to elevate dentistry in England from a trade to a profession. He had much to do with the alteration of the Charter of the Royal College of Surgeons of England. The Medical Act of July 1, 1858, made it lawful by charter for Queen Victoria "to grant to the Royal College of Surgeons of England power to institute and hold examinations for the purpose of testing the fitness of persons to practise as dentists." This the Queen did and the charter of September 8, 1859, laid down that the College "should have the power to institute and hold examinations."

The first dental hospital and school opened on November 1, 1858, at 32 Soho Square, London, and was known as the Dental Hospital of London. The first examination was held in 1860 and the significance of the charter of 1859 is that the College did not require the new licentiates to be medically qualified, and thereby a separate dental profession was created. The Calendar of the Royal College of Surgeons for 1860 contains the names of the first 100 persons who received the "Certificate of Qualification in Dental Surgery."

It is interesting to recall that 20 years earlier, in 1839, the first college of dentistry in the world was started in Baltimore, U.S.A., with Horace Hayden as president and Chapin Harris as dean.

It can be said that dentistry as a profession in Great Britain is one hundred years old, an appropriate age at which to assess its growth, development, organization and administration, impact on the public, its present status, and to hazard some thoughts on its future.

From the very beginning there were marked differences in the ideas of dental establishments in the United States and in Great Britain, the education of the dentist being foremost in the United States whereas in Great Britain the dominant factors were the relief of pain and

the treatment and prevention of dental disease of the poorer classes. In fact, in England the education of the dentist was of secondary consideration. Thus history shows through the last hundred years the development in the United States of dental schools, whereas in Great Britain there has always been the dental hospital and school. In the one, treatment of patients has been secondary to, and purely for, teaching purposes and assisting in the education of the dental studies. In the other, care of the poor has dictated the treatment, thus influencing the teaching and education of the student.

This in turn has influenced the tendencies of dental practice in the United States and Great Britain, for the development of operative conservative dentistry was much more rapid and reached a higher standard in the States, whereas the hospital and surgical side of dental practice, with consequent closer association with medicine on the one hand and the supplying of dentures on the other, characterized British dental practice.

This divergence existed until the last 20 years when dental education in Great Britain has improved out of all recognition until today it can be said without bias that the newly qualified dentist in Great Britain is as well equipped to start private practice as his counterpart from anywhere else in the world.

It is necessary to go back to the early history of the development of the dental profession in Great Britain if its present-day position is to be understood. In July of 1878, the government passed the first Dentists' Act, an attempt to control the practice of dentistry by limiting it to those admitted to a Register under the aegis of the General Medical Council. The Act attempted to protect the title "Dental Surgeon" by limiting it to those on the Register. It raised the status of dentistry in the public esteem but failed in its object, for while in January 1878 there were approximately 2,200 dentists practicing in Great Britain, in June 1878 there were 5,289 names on the Register, a large proportion obviously being bogus and unqualified.

In 1921, when the second Dentists' Act was passed, little more than one-third of those practicing dentistry had passed an examination after being trained in one of the schools. This Act limited the practice of dentistry to those whose names appeared on the Dental Register. Since 1921 admission to the Register has been dependent on passing an approved examination, the standard of which was the responsibility of the General Medical Council until the passing of the fifth Dentists' Act in 1956 transferred these powers to the General Dental Council.

A word of explanation is in order about the purpose and functions of the Dental Board of the United Kingdom, established under the second Dentists' Act of 1921 and terminated July 4, 1956, with the passing of the fifth Dentists' Act, 1956, which set up the General Dental Council.

Under the supervision of the General Medical Council the Board provided a central authority and machinery to enforce discipline, the establishment of an academic cadre and systemization of teaching in the school with the dental curriculum becoming highly disciplined within the universities. This central authority also awarded building and equipment grants, and provided for financial aid to more than one-quarter of all the United Kingdom graduates and licentiates whose names were added to the Register between 1921 and 1939.

For 35 years the General Medical Council supervised the disciplinary functions and finances of the Board and many other supervisory duties now assumed by the General Dental Council. It had as wide powers over the dental profession as the General Medical Council has over the medical profession.

The Act of 1921, although it introduced to the Dental Register a large number of virtually unqualified names,

successfully made dentistry a profession in the full sense of the term during the last 38 years. In assessing dental practice in Great Britain it should be remembered that a good proportion of dental service has been given to the public by men who had not had the benefit of training at a dental school. These men were called "21" men after the date of the Act and for many years had their own societies, separate from the British Dental Association, a fact which made things easier for the then Government when bargaining with the profession over the introduction of the General Dental Service of the National Health Service. That is now past, for there is unity in the profession and only one national association, the British Dental Association.

THE BRITISH DENTAL ASSOCIATION

The British Dental Association was founded in 1880. In 1949 it amalgamated with the Incorporated Dental Society and the Public Dental Service Association. The current membership is approximately 11,000.

The Dentists' Register contains the names of approximately 16,000 dentists, of whom about 13,000 are in active practice. The bulk of these practicing dentists are members of the Association.

Association membership is open to all registered dentists after election by the Council of the Association on the recommendation of three existing members. The present annual subscription for ordinary members is nine guineas per annum but there are variations for dentists in certain classes, such as Armed Forces, retired, and so forth. Membership includes the great majority of dentists providing general dental services under the National Health Service, dentists practicing on their own account outside the Health Service, health center dental officers, hospital dental officers, local authority dental officers, dental officers in the Armed Forces and university professors and teachers of dentistry.

The Association is made up of 20 branches based broadly on a geographical area: Southern Counties' Branch, Metropolitan Branch, London, West of Scotland Branch, and so on, and each branch has many sections also formed on a geographical basis within the branch area. There are in all 107 sections.

Each branch, according to its numerical strength, elects one or more delegates to the Representative Board which meets three or four times each year. The Board elects its Council, the continuing body between Board meetings, and sets up standing committees which carry on the business of the Association.

The Association has, in its almost 80 years of existence, a good record of carrying out its objects of "promotion of the dental and allied services and the maintenance of the honour and interests of the dental profession." However, since the introduction of the National Health Service the activities of the Association have been in two broad divisions: the first, academic and scientific, which has unfortunately suffered for the second, which may be termed "political." On this side the Association provides nearly all its members with a service essential to their professional life; namely, negotiating between the State and the profession for better terms of pay and conditions of service in every branch of the Health Service.

Protection against inroads on the professional freedom of dental practitioners, their standards of living and their conditions of service is secured only as a result of the efforts of the British Dental Association.

There has been a steady encroachment of politics on dentistry during the last decade, and this must be a matter of regret to all dentists but especially to the private practitioner. However, every branch and section has regular monthly meetings with, for the most part, scientific papers. The annual conference each

year stages a well-planned scientific program. The *British Dental Journal*, published twice each month, is one of the most widely read dental journals in the world.

The Association, run by a few overworked and enthusiastic colleagues and a small staff, with a budget far too small for its needs, merits the full support of every dentist in Great Britain. It is doing a good job under difficult conditions.

In my opinion, the Association should strengthen its policies and status so that no decisions affecting dentistry in the United Kingdom would be taken by any agency, organization or individual without consultation with the British Dental Association. This can only come about by public recognition that the dental profession wholeheartedly supports, and is loyal to, a strong and well-governed association fully representing organized dentistry in Great Britain.

DENTAL EDUCATION

There are at present 15 undergraduate dental schools in Great Britain, each one a School of a University and associated with a dental hospital: five in London, seven in the Provinces, three in Scotland. A further one is planned for Wales. There are in addition one university dental school in Northern Ireland and four university dental schools in the Republic of Ireland whose graduates are admitted to the Dental Register. The Royal College of Surgeons of Ireland is also an undergraduate dental teaching institute and there is a postgraduate institute associated with the Eastman Dental Hospital.

Including the Irish schools, there are accommodations and facilities to enroll approximately 698 new students a year. This should be compared with the estimated required number of 1,100 new recruits each year to make up for deaths, retirements and demand for treatment. New dental schools and increased accommodations in the existing schools are required to produce the necessary number of dentists as a basis for a satisfactory dental health service in Great Britain.

There are at present 31 university chairs in dental subjects, each entitling the holder to be termed "Professor." There is no doubt that there has been a marked growth and development of academic dentistry in Great Britain during the past 40 years largely due to two sources:

1. The late Dental Board, now the General Dental Council, which between 1929 and 1947 spent £130,000 (figures relating to money are all pounds sterling) on dental education especially in grants to universities to appoint full-time dental teachers and, in addition, £67,000 as capital grants for equipment and building alteration. The grants were made possible out of its income collected from the dental profession by way of annual registration fees, at present £4.10.0d per annum. No further grants were made by the Dental Board after 1947 when the responsibility passed to the University Grants Committee.

2. The Government through its University Grants Committee, which earmarked grants to universities of £150,000 in 1947, rising to £300,000 in 1952. These grants, after 1952, have been merged in the general block grant for universities and colleges and so forth in Great Britain which, in the fiscal year 1959-1960, amounted to approximately £58,000,000.

The University Grants Committee is appointed by the Chancellor of the Exchequer and has two functions: (1) to advise the Treasury on the total money provision to be made for universities and (2) to allocate the total provision between universities.

The specific purpose of these grants was to enable the standards of dental education in the universities to be raised to a level more nearly approaching the older established departments.

It should be realized that the acceptance by the universities of the responsibility for dental education is a comparatively recent matter and this has meant that dentistry has had to compete for the necessary funds for its development with the older faculties, especially medicine.

The situation today is that while the standards of dental education are of the highest and the B.D.S. offered by the universities and the L.D.S. by the Royal College of Surgeons are worthy of recognition and acceptance anywhere in the world, many of the schools are old and require rebuilding and re-equipping and new schools are required in certain areas.

It would seem to me that among the problems of the future for academic dentistry are: (1) to realize and plan for the training of auxiliary services which would appear to be essential to cope with the demands of a comprehensive health service and (2) to consider seriously whether it is necessary to have such lengthy training to produce dentists to work in a National Health Service. A system of a four-year course for the general dental practitioner and a further two years to acquire a higher degree with specialist status could well be considered.

In general the problem of dental education would appear to require very serious consideration by those responsible and reassessment at an international level. There is no doubt that the dental profession is unable to supply the needs of the world's population to maintain dental health, and a broader and more realistic concept in dental education is required which would cater not only to advanced countries but also to the population of backward countries.

There are nineteen bodies in Great Britain which examine in dental subjects, and nearly all grant higher degrees or diplomas in dentistry other than the B.D.S. or L.D.S. The higher degrees conferred by universities are Masterships, M.D.S., or, in some cases, Doctorates, D.D.S. The Royal College of Surgeons of England and Edinburgh grant a Fellowship in Dental Surgery, F.D.S., and there are Diplomas in Orthodontics and Public Dentistry available.

THE ROYAL COLLEGES

The Royal College of Surgeons of England is primarily an examining body but is also becoming one of the most important centers of postgraduate teaching and research in the world, especially in the basic medical services, anesthesia and dental surgery. Fellowship of the College is an essential prerequisite for specialist status in any branch of surgery. As mentioned at the outset, the College was granted powers to examine in dental surgery and award a diploma, L.D.S., R.C.S., which entitles its holder to practice. Twelve years ago a dental faculty was formed within the College by Royal Charter and a Fellowship in Dental Surgery, F.D.S., R.C.S., was created to serve as evidence of postgraduate training for specialist work in dentistry. A Board of Faculty was formed which, under the Council of the College, conducts all dental business relating to undergraduate examinations, postgraduate teaching, lectures, research and examinations. It is one of the closest and most valued links between dentistry and general surgery in Great Britain.

The Royal College of Surgeons of Edinburgh first granted licenses in dental surgery in 1879, and in 1949 instituted a Fellowship in Dental Surgery.

The College does not have a dental faculty but a dental Council within the College, presided over by a "Convenor" elected by Fellows in Dental Surgery of the College.

There also exists in Great Britain a part of the British Postgraduate Medical Federation of the University of London, the Institute of Dental Surgery for postgraduate instruction. This is associated with the Eastman Dental Hospital and

provides long and short postgraduate courses in all branches of dentistry, enabling dental practitioners to obtain the best possible postgraduate teaching and practice and also helping trainee specialists, teachers and research workers. Candidates are accepted from all over the world.

It is surprising that more use is not made of this Institute by graduates from the United States and Canada.

One final word on this question of postgraduate dental education. It is in my opinion of great importance that dentists may continue to take further training in the United States. In the past, it has been possible to take the undergraduate, D.D.S., degree after one year's further training in some United States' schools. This has now been virtually stopped, the minimum time requirement being two years and this only after passing an unfamiliar entrance examination and undergoing aptitude tests. The creation of these requirements has practically stopped young British graduates from also graduating in the United States. This is very serious, for the exchange of thoughts and ideas has done a great deal to raise the standard of dental clinical work in this country and, I believe, to create a good understanding between the members of the profession in each country. While it is realized that there are postgraduate courses in some dental schools in the United States leading to a higher degree, it is to be hoped that for the mutual benefit of the English-speaking countries of the world that some arrangement can eventually be made whereby it will be much easier than at present for graduates in dentistry to visit and take degree courses in each other's countries.

DENTAL RESEARCH IN GREAT BRITAIN

In 1958 the British Dental Association published a memorandum on Dental Research in the United Kingdom. The object of the memorandum was: (1) to present information concerning research activities in the field of dental service in the United Kingdom, (2) to discuss ways whereby these activities could be maintained and (3) to make recommendations.

From the information gathered it was obvious that there is considerable interest being taken in the problem of dental research by a number of organizations whose activities have encouraged the development of a body of dental research workers in this country.

The evidence collected from the university schools and other organizations showed that much valuable research is being done in the United Kingdom but that expansion in dental research is essential. The recommendations made in the memorandum were:

1. Senior teaching appointments in dentistry should be made with due regard to research capacity and interest.

2. Provision should be made for grants and awards for dental research and for the establishment of fellowships on a much wider scale.

3. Existing teaching and research staff should be given adequate time for the supervision of junior research workers. The need for experience at all levels of the dental staff of the universities must be accepted, as must the necessity to offer remuneration at a level which will attract the most able members of the profession.

4. Selected dental students should be encouraged to obtain degrees in basic science and some science students should be encouraged to enter dentistry.

5. Plans for the expansion of research accommodation in the existing dental schools should be approved and implemented.

6. Plans for the establishment of new dental schools should include adequate provision for the development of research.

7. The Minister of Health, the Minister of Education and the Secretary of State for Scotland should be reminded of the importance of dental research and the contribution it may make towards the eventual lightening of the State's financial burden for dentistry.

8. The University Grants Committee should be requested to make available for dental research sums of money sufficient to implement these recommendations.

9. Consideration should be given to the establishment of a National Institute for Dental Research.

The research position might be summarized by saying that there is an acute shortage of money to provide the necessary facilities with adequate accommodation and equipment to attract the right type of research workers but there are many splendid men and women dedicated to dental research in Great Britain who are producing valuable results.

The irony of the situation in Great Britain is that with the enormous expenditure of millions of pounds for treatment in the National Health Service, little or nothing is spent on prevention or research. Both the medical and dental professions are having to approach commerce and industry to support their research projects.

DENTAL PRACTICE

In Great Britain dentistry is provided in the following ways: (1) where remuneration is by way of fees and (2) where remuneration is by way of salary.

Remuneration from Fees • Dentists who receive fees are in general or specialist practice and have private patients or are in general practice under the National Health Service.

General and Specialist Practice • Dentists in general or specialist practice give treatment to private patients in accordance with arrangements made between the dentist and the patient and for which the patient directly pays the dentist. It is estimated that about 5 per cent of all dental patients in Great Britain are treated by private arrangement. A dentist is free to engage simultaneously in private practice and to practice under the National Health Service, but he cannot treat the same patient under both arrangements at once, though without doubt such situations do exist.

I am engaged in purely private practice and do not treat patients within the National Health Service. It is estimated that there are perhaps 400 to 500 such practitioners in Great Britain, the large bulk situated in and around London and other large cities like Birmingham, Liverpool, Edinburgh and Glasgow. They are older men, possibly with younger partners or associates and, significantly, in London they include almost all the men with United States or Canadian qualifications who are not engaged in full-time teaching. These dentists are doing the highest standard of work with splendid equipment on patients in the upper income bracket who are paying fees of a high nature, up to $25 per hour. It is my opinion that while there will always be some private practice, the law of supply and demand being what it is, in the years to come many private practices will die out as the older dentist passes on, especially if conditions of work and remuneration within the National Health Service continue to improve.

The problem of introducing into these private practices younger men who will recognize a value to good will and be willing to pay for that and experience is an increasingly difficult one, especially when one reads later of the financial temptations to the newly qualified graduate to work within the Health Service. Make no mistake, private dental practice is flourishing where it exists in Great Britain but few patients can afford it and

fewer of the younger dentists are interested in it.

There is comparatively little specialization in dental practice in Great Britain. There are a number of orthodontists, few oral surgeons, and very few periodontists and pedodontists. There is no organization in Great Britain which assesses the clinical and educational standards for specialization.

General Practice under the National Health Service • Dentists in general practice give treatment to patients of all kinds under the National Health Service. Any dentist on the Register, unless disqualified by the National Health Service Tribunal, has a right to take part in the Service and to treat patients under it.

The patient asks a dentist who is taking part in the Service to accept him for treatment. The dentist accepts the patient for a particular course of treatment and is paid by the local Executive Council when it is properly completed. All patients, other than expectant and nursing mothers and persons under 21 years of age, are liable to pay charges for dental treatment, for example up to £4.5.0d for dentures. A patient may also pay the difference between the cost of clinically necessary treatment and treatment which he wants but which is more expensive. Many kinds of treatment may now be carried out without prior approval of the Dental Estimates Board, but for many of the more complicated types of treatment, such as orthodontics, the prior approval of the Board is required.

When treatment is completed the dentist receives from the Executive Council payment in accordance with a scale of fees fixed by regulation less the charge paid by the patient. The remuneration which the dentist receives under the National Health Service is a gross payment so that out of it he provides the accommodation, staff, equipment and materials necessary for his work, the cost of which amounts to roughly half the gross payment.

It is the writer's opinion that the large bulk of dentists in general practice in the National Health Service are reasonably satisfied with the conditions and financial return, especially those in the younger age brackets. Their incomes vary tremendously, being somewhat dependent on hours of work. For example, a single handed practitioner's estimated basic net income from National Health Service work alone is known to be less than £1,000 and higher than £3,000 per annum. The British Dental Association in its memorandum to the Royal Commission on the remuneration of National Health Service physicians and dentists recommended that the "remuneration of general dental practitioners in the National Health Service should be increased, by the institution of a scale of fees designed to produce for a thirty-three hours week £3,200 net per annum, less 8% representing the Government Superannuation contribution giving approximately £2,950 per annum."

It should be pointed out that the superannuation scheme for those working in the Health Service to which both dentist and State contribute provides a fair pension at the age of 65.

It has been shown that it is the older man working in the general dental service whose income suffers, in that he is unable to maintain the pressure of long hours of chairside work. Unfortunately the age distribution of practitioners working in the general dental service shows that 28 per cent are over 60 and 33 per cent over 55. It is understandable that the grumbles about the service are widespread among the older practitioners whereas the younger man appears to be fairly well satisfied. I quote from a recent letter in the *British Dental Journal*: "Under the National Health Service I can offer the very best treatment to every patient and it will be approved and paid for, so long as it is the best treatment.

My practice does not now boast a single private patient. The National Health Service is here and it is here to stay. That there is room for certain improvements is not in dispute but basically and fundamentally it is a great and wonderful achievement that has saved countless people from financial worry and physical pain and I for one am proud to serve it."

With good equipment, regular income, the building of a pension, no bad debts, little difficulty in building a practice, quite a measurable amount of clinical freedom and an average standard of practice, it is understandable that the younger practitioner finds little to grumble at, working in the general dental service. There are in all about 11,500 dentists in general practice in Great Britain, in private and National Health Service.

Remuneration from Salary • Dentists who receive salaries either work for local authorities or health centers, practice in hospitals, teach, or serve the armed forces.

Work for Local Authorities • Local authorities provide free dental services in clinics for the priority classes of mothers and young children through the Maternity and Child Welfare Services and the School Dental Service. The dentists who undertake this work are on the staff of the Local Authority either as full or part-time employees, and on an average devote ten-elevenths of their time to the School Dental Service and one-eleventh to maternity and child welfare.

Treatment is provided in local health authority clinics in England and Wales by the equivalent of 1,200 full-time dentists. In the writer's opinion it is this part of the Service which provides the greatest cause for worry. There is inadequate recruitment, poor conditions of remuneration and insufficient to attract the young practitioner to enter the School Dental Service.

Health Centers • A small number of dentists work in health centers. This is part of the general dental service and is an alternative to general practice in the Health Service. The dentists are paid by local executive councils. I am convinced that the number of health centers will grow and that this form of medical and dental service could ultimately provide the best method of organizing, administering and practicing general medicine and dentistry within a National Health Service. This would appear to be a certain development for the future.

Practice in Hospitals • Dentists treat patients in hospitals and in the great majority of instances this treatment is provided under the National Health Service. These hospital dental services have expanded considerably in recent years. The chief purpose of the dental departments in dental hospitals is to make available the services of consultants to other hospital departments and to general dental practitioners. The service is most highly developed in teaching hospitals. In other areas its extent varies widely.

Some general dental treatment is provided for inpatients in hospitals for the care of the chronically ill without charge, except for the provision of dentures. There are about 150 dentists in full-time hospital practice.

Teaching • Dentists are engaged in teaching and research work both full and part-time. A fulltime academic career in Great Britain can provide a most attractive future for the younger man.

All the schools are now attached to universities. New chairs are being established, many fulltime appointments are available and salaries and conditions of work are improving. The status of academic dentists in Great Britain was never higher, and the leaders are wielding a considerable amount of power in regulating and administering the profession.

In the writer's opinion, it is to be regretted that there is not more liaison by the academic bodies with the British Dental Association in the belief expressed earlier that no major decisions affecting the dental profession should be taken without prior consultation with organized dentistry represented by the British Dental Association. It is also a matter of opinion whether the reduction in the use of part-time clinical teachers to the point of abolition in some schools is to the ultimate advantage of the dental student. There are about 250 dentists in teaching, research and administrative positions.

Armed Forces • Approximately 500 dentists are engaged in the treatment of members of the three Armed Forces, Navy, Army and Air Force, each with separate dental branches. In a report of a committee set up to review the arrangements for providing medical and dental services for the Armed Forces at home and abroad in peace and war, the following observation occurs: "the outstanding feature of the dental branches of the Armed Forces is a serious over-all shortage of qualified dental officers, which has inevitably resulted in a deterioration in the standard of treatment in the Services."

In my opinion, the Armed Forces dental services in Great Britain offer to a younger graduate a very interesting career and one with quite reasonable prospects of a successful future, both short term and long term. The terms of pay and allowances permit a decent standard of living and chances of promotion are good. In view of the shortage of manpower and comparatively high costs, amalgamation of the three dental branches seems the eventual solution.

THE FUTURE OF DENTISTRY IN GREAT BRITAIN

I have related briefly how dentistry is practiced in Great Britain. Undoubtedly the National Health Service dominates dental practice, and it is natural to wonder what the future holds.

Look at the Health Service as a whole: after ten years it is now costing the nation approximately £757,000,000 for the year 1958-59, of which approximately £51,000,000 relate to the general dental services. These costs are met out of direct and indirect taxation. If there were no Health Service, the effect would be tremendous. Income tax could be reduced and taxes on beer, spirits, tobacco, and so forth reduced by half. There is no suggestion that the Health Service should be abolished, but it is generally felt that the present system could be modified to provide a better service at a lower cost to the nation.

What is the evidence for this? Undoubtedly, money is wasted in excessive control (bureaucracy and paper work) and there is a feeling that standards of practice are falling. It has been suggested that a nation can afford a free health service only for the genuinely needy and for children and that for the rest charges must be made. Reforms must be made which will make a better Health Service by, making those who use it realize its cost and its weaknesses and by paying more when the Service is used.

So far as the general dental service is concerned, it is hard to foresee future developments. The profession in Great Britain is almost static in membership. The demand for treatment shows no sign of decrease from the present level. As a long term policy, more schools could be built to produce new dentists, and without doubt some part of the dentists' work eventually will be delegated to auxiliary members whose training is being planned now under the aegis of the General Dental Council as provided in the Dental Act, 1956. This is part of the solution to the problem, but there are other essential ways of relieving the situation: dental health education of the public so that people may help themselves in the prac-

tice of home preventive treatment and learn to see the dentist regularly and early enough. Also, as a preventive measure, extensive fluoridation of Great Britain's domestic water supplies would decrease the incidence of dental decay in the child population.

There is one thing certain: if the rate of costs increases in the next ten years as it has in the first ten, then the great social experiment of a National Health Service could bring Great Britain to a state of penury.

The first year's bill, in 1948, was £360,000,000. After 10 years (1958-59) it was £757,000,000. In 1968, after 20 years, I can only put a question-mark and say that if there are no drastic changes "God help the taxpayer," for it is he or she after all who supplies the need and creates the demand for dental treatment, and on the result of such treatment will depend the future judgment of the status of dentistry as a profession in Great Britain.

35 Devonshire Place

*Secretary General, Fédération Dentaire Internationale.

The Art of Getting Along • Sooner or later, a man if he is wise discovers that life is a mixture of good days and bad, victory and defeat, give and take. . . . He learns that it doesn't pay to be a too sensitive soul; that he should let some things go over his head like water off a duck's back. . . . He learns that he who loses his temper usually loses out. . . . He learns that all men have burnt toast for breakfast now and then, and that he shouldn't take the other fellow's grouch too seriously. . . . He learns that buck-passing always turns out to be a boomerang, and that it never pays. . . . He comes to realize that things could run along perfectly well without him. . . . He learns that it doesn't matter so much who gets the credit so long as the "end" is achieved. . . . He learns that even a bowery derelict is human and that it does no harm to smile and say "good morning," even if it's raining. . . . He learns to sympathize with youngsters going forth, because he remembers how bewildered he was when he first started out. . . . He learns that no man ever got to first base alone and that it is only through cooperative effort that we move on to better things. . . . He learns that folks are not any harder to get along with in one place than another, and that the "getting along" depends about 98 per cent on his own behavior. *Ruby Richardson. The Kalends 39:24 May-June 1960.*

deaths

BUREAU OF MEMBERSHIP RECORDS

Ackerman, Andrew J., New York; University of Pittsburgh School of Dentistry, 1928; died June 21; age 55.

Albino, Joseph N., Downey, Ill.; Loyola University School of Dentistry, Chicago College of Dental Surgery, 1932; died May 14; age 51.

Anderson, Cladie G., Mount Hope, W. Va.; Ohio College of Dental Surgery, University of Cincinnati, 1911; died June 11; age 79.

Apablasa, Cayetano J., Los Angeles; University of Pennsylvania School of Dentistry, 1900; died July 9; age 83.

Ashworth, William, Chicago; Loyola University School of Dentistry, Chicago College of Dental Surgery, 1934; died April 17; age 55.

Atkinson, Alfred H., Minneapolis; University of Minnesota School of Dentistry, 1926; died March 7; age 63.

Austin, George L., Knoxville, Tenn.; Vanderbilt University School of Dentistry, 1908; died July 21; age 80.

Autenrieth, Josiah W., Fort Wayne, Ind.; Ohio College of Dental Surgery, University of Cincinnati, 1900; died June 10; age 92.

Ballenger, William D., Lafayette, Ga.; Southern Dental College, 1909; died June 16; age 72.

Bassett, Paul L., New York; University of Pennsylvania School of Dentistry, 1904; died June 14; age 78.

Bazer, Philip, Chicago; Chicago College of Dental Surgery, 1918; died May 25; age 64.

Bennett, Hal C., York, Ala.; Louisville College of Dentistry, 1911; died April 14; age 73.

Berger, Harold, Brooklyn; University of Pittsburgh School of Dentistry, 1946; died June 15; age 37.

Bertrand, Carl E., Syracuse, N. Y.; University of Michigan School of Dentistry, 1911; died Feb. 15; age 69.

Blais, Otto R., Muskogee, Okla.; Northwestern University Dental School, 1921; died March 18; age 65.

Bloom, Victor, New York; died June 4.

Borchardt, Herbert, Washington, D.C.; Georgetown University School of Dentistry, 1911; died June 16; age 69.

Borchardt, Joseph W., Waterbury, Conn.; Temple University School of Dentistry, 1907; died May 3; age 75.

Boysen, Harry A., La Jolla, Calif.; Northwestern University Dental School, 1904; died May 22; age 81.

Brackmann, Albert A., Pittsburgh; University of Pittsburgh School of Dentistry, 1916; died January 14; age 70.

Brasted, George H., Utica, N. Y.; University of Buffalo School of Dentistry, 1914; died May 28; age 68.

Bresch, Maximilian S., Scranton, Pa.; Pennsylvania College of Dental Surgery, 1903; died July 2; age 88.

Brewer, Andrew E., Richmond, Va.; Medical College of Virginia School of Dentistry, 1925; died May 12; age 65.

Broderson, Philip B., St. Paul; University of Minnesota School of Dentistry, 1915; died March 16; age 68.

Brown, Edward W., St. Paul; Louisville College of Dentistry, 1901; died May 5; age 82.

Brown, Harry L., Chicago; Chicago College of Dental Surgery, 1916; died June 6; age 74.

Brundage, Leon C., Ann Arbor, Mich.; University of Michigan School of Dentistry, 1943; died May 10; age 40.

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MEETINGS OF THE AMERICAN DENTAL ASSOCIATION

One-Hundred and Second Annual Session	October 16-19, 1961	Philadelphia
One-Hundred and Third Annual Session	October 29-November 1, 1962	Miami Beach, Fla.
One-Hundred and Fourth Annual Session	October 14-17, 1963	Atlantic City, N.J.
One-Hundred and Fifth Annual Session	November 9-12, 1964	San Francisco

MEETINGS OF CONSTITUENT SOCIETIES

State	*Date*	*Place*	*Secretary and Address*
Alabama	Apr. 24-26	Mobile	C. R. Crook, Professional Center, Montgomery
Alaska	July 10-12	Anchorage	W. E. Alexander, 406 G St., Anchorage
Arizona	Apr. 12-15	Phoenix	J. F. Vaughn, 2727 N. Central Ave., Phoenix
Arkansas	Apr. 9-12	Little Rock	D. M. Hamm, Box 89, Clarksville
California	Apr. 16-19	San Francisco	W. J. Healy, 518 Sutter St., San Francisco 2
S. California	Apr. 24-26	Los Angeles	J. H. Thomason, 903 Crenshaw Blvd., Los Angeles 19
Colorado			G. H. Siersma, 903 Republic Bldg., Denver 2
Connecticut	May 10, 11	Hartford	E. S. Arnold, 37 Linnard Rd., W. Hartford
Delaware	June 9, 10	Wilmington	W. W. Flanagan, Jr., 309 S. State, Dover
Dist. of Columbia	Mar. 12-15	Washington	B. D. Mattox, 1835 Eye St., N.W., Washington 6
Florida	May 21-24	Miami Beach	E. M. Farber, 518 Tampa St., Tampa
Georgia			F. M. Butler, Jr., 701 Southern United Bldg., Macon
Hawaii			J. H. Dawe, 291 Alexander Young Bldg., Honolulu 13
Idaho			H. E. Burgess, 151 Fourth Ave., N., Twin Falls
Illinois	May 8-10	Peoria	P. W. Clopper, 632 Jefferson Bldg., Peoria
Indiana	May 14-17	Indianapolis	C. L. Howell, 1012 Hume Mansur Bldg., Indianapolis 4
Iowa	May 1-3	Des Moines	H. N. Hake, 639 Insurance Exchange Bldg., Des Moines 9
Kansas	May 7-9	Kansas City, Mo.	F. A. Richmond, Brotherhood Bldg., Kansas City 1
Kentucky	Apr. 9-12	Louisville	A. B. Coxwell, Jr., 2208 Dundee Rd., Louisville 5
Louisiana	May 5-7	Lafayette	J. S. Bernhard, 231 Atkins Ave., Shreveport 26
Maine	June 15-17	Rockland	S. M. Gower, 6 Coburn Ave., Skowhegan
Maryland	May 7-10	Baltimore	W. Schunick, 19 Medical Arts Bldg., Baltimore 1
Massachusetts	Apr. 30-May 3	Boston	H. E. Tingley, 227 Commonwealth Ave., Boston
Michigan	Apr. 10-12	Detroit	F. Wertheimer, Michigan Dept. of Health, Lansing
Minnesota	Apr. 17-19	Minneapolis	C. V. E. Cassel, 2236 Marshall Ave., St. Paul 4W
Mississippi	June 25-28	Biloxi	M. C. O'Keefe, Medical Arts Bldg., Jackson 2

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Missouri	May 7-10	Kansas City	E. D. Suggett, Merchants Bank Bldg., Jefferson City
Montana	May 4-6	Great Falls	R. C. Ritter, 1236 N. 28th St., Billings
Nebraska	Apr. 24-26	Lincoln	F. A. Pierson, Federal Securities Bldg., Lincoln
Nevada	Apr. 30-May 2	Las Vegas	O. M. Seifert, 821 Ryland Ave., Reno
New Hampshire	June 18-20	Whitefield	F. E. Williams, 517 Milton St., Manchester
New Jersey	May 14-17	Atlantic City	J. G. Carr, 407 Cooper St., Camden 2
New Mexico	May 10-13	Albuquerque	E. P. Purtell, 2917 Santa Cruz Ave., S.E., Albuquerque
New York	May 15-17	Syracuse	C. A. Wilkie, 268 Ashland Pl., Brooklyn 17
North Carolina	May 14-17	Pinehurst	S. B. Towler, P.O. Box 11065, Raleigh
North Dakota			D. R. Perry, Box 866, Bismarck
Ohio	Nov. 13-16	Columbus	E. G. Jones, 185 E. State St., Columbus
Oklahoma	Apr. 23-26	Tulsa	W. C. Hopkins, 210 Plaza Court Bldg., Oklahoma City
Oregon	Mar. 6-8	Portland	T. D. Holder, Selling Bldg., Portland
Panama C. Z.			H. L. Mertz, Jr., P.O. Box 1417, Balboa
Pennsylvania	May 18, 19	Hershey	I. Sissman, 217 State St., Harrisburg
Puerto Rico	Jan. 22-25	San Juan	R. Gonzalez R., Box 10452, Caparra Heights
Rhode Island	Jan. 17, 18	Providence	E. M. Nelson, 901 Union Trust Bldg., Providence
South Carolina	May 7-10	Columbia	J. E. Wallace, 1506 Gregg St., Columbia
South Dakota	May 14-16	Aberdeen	R. E. Decker, 2909 Poplar Dr., Sioux Falls
Tennessee	May 14-18	Gatlinburg	K. P. Ezell, 210 23rd Ave., N., Nashville 5
Texas	Apr. 30-May 3	Houston	C. A. McMurray, 3707 Gaston Ave., Dallas 10
Utah	May 18-20	Salt Lake City	R. C. Dalgleish, 1554 Princeton Ave., Salt Lake City
Vermont	June 22-24	Vergennes	E. C. Woods, 128 Merchants Row, Rutland
Virginia	Apr. 30-May 3	Roanoke	M. E. Henderson, Shenandoah Bldg., Roanoke 11
Washington			D. R. Shaw, 417 Grosvenor House, 500 Wall St., Seattle 1
West Virginia	July 16-19	White Sulphur Springs	P. H. Loflin, 109 E. Main St., Beckley
Wisconsin	Apr. 24-26	Milwaukee	C. J. Baumann, Jr., 704 W. Wisconsin Ave., Milwaukee
Wyoming	June 15-17	Laramie	T. J. Drew, State Office Bldg., Cheyenne

MEETINGS OF STATE BOARDS OF DENTAL EXAMINERS

State	*Date*	*Place*	*Secretary and Address*
Alabama	June 25-30* June 26†	Birmingham	W. L. Smith, 524 Chestnut St., Gadsden
Alaska			J. E. Miller, 1000 Fireweed Lane, Anchorage
Arizona			W. G. Biddulph, 1611 N. Second Ave., Glendale
Arkansas	June 18-23*†	Little Rock	G. Cone, 113 S. Pecan St., Osceola
California			T. R. Flinn, 1021 O St., Rm. A-597, Sacramento 14
Colorado			B. DeRose, Republic Bldg., Denver 2
Connecticut	Nov. 20, 21	Bridgeport	M. J. Zazzaro, 99 Pratt St., Hartford 3
Delaware			J. F. Maguire, 1200 N. Van Buren St., Wilmington
Dist. of Columbia	Jan. 9-13*†	Washington	J. A. Madden, 1740 Massachusetts Ave., N.W., Washington 11
Florida	July 2-12* July 2, 3†	Jacksonville	R. P. Taylor, Jr., P.O. Box 2913, Jacksonville 3
Georgia	May 29-31	Atlanta	H. M. Robertson, 206 Donehoo St., Statesboro
Hawaii	Feb. 9-12‡		F. S. Kagihara, 1644 S. King St., Honolulu
Idaho			W. M. Smith, 305 Fort St., Boise
Illinois			R. I. Humphrey, 185 N. Wabash Ave., Chicago
Indiana	Dec. 5-8*†	Indianapolis	C. A. Frech, Gary National Bank Bldg., Gary

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Kansas	Jan. 23-25*†‡		R. C. Windscheffel, Medical Arts Bldg., Smith Center
Kentucky			J. J. Kelly, 102 W. Madison St., Franklin
Louisiana			A. R. deNux, 617 N. Monroe St., Marksville
Maine			A. H. Garcelon, 133 State St., Augusta
Maryland	Nov. 7-9	Baltimore	F. J. Bryce, 303 Granville Dr., Silver Spring
Massachusetts			M. E. Sullivan, 33 State House, Boston
Michigan	Jan. 22-28 June 11-17	Ann Arbor	J. L. Champagne, 3714 W. McNichols Rd., Detroit 21
Minnesota			E. A. Nelson, 2236 Marshall Ave., St. Paul 4W
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Nebraska			H. E. Weber, Stuart Bldg., Lincoln
Nevada			R. Whitehead, 40 W. First St., Reno
New Hampshire			L. U. Bergeron, 211 High St., Somersworth
New Jersey	Nov. 28, 29* Nov. 30* Nov. 29†	Philadelphia Trenton Philadelphia	C. J. Schweikhardt, 150 E. State St., Trenton 8
New Mexico	June 19-24*†‡		G. D. Hastain, Box 1007, Clovis
New York	Dec. 1, 2 Dec. 6-9	New York Buffalo New York Albany Syracuse Buffalo	D. F. Wallace, 23 S. Pearl St., Albany 7
North Carolina			J. H. Guion, Doctors Bldg., Charlotte 7
North Dakota			F. A. Maides, First National Bank Bldg., Grand Forks
Ohio			D. E. Bowers, 322 E. State St., Columbus 15
Oklahoma			W. H. Stephens, Plaza Court Bldg., Oklahoma City
Oregon	Dec. 5-7	Portland	C. Wheeler, Medical Arts Bldg., Portland
Pennsylvania	Dec. 1, 2* Dec. 1†	Philadelphia	P. Swanson, 8111 Jenkins Arcade, Pittsburgh
Puerto Rico			J. Mercado C., Comercio St., #452, San Juan
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Utah			H. R. Nordberg, 143 S. Main St., Salt Lake City 1
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Virginia	June 12-17* June 14, 15†	Richmond	J. M. Hughes, Medical Arts Bldg., Richmond
Washington			W. B. Lamey, Medical Dental Bldg., Everett
West Virginia	June 19-21* June 20, 21†	Morgantown	A. B. Drake, 1355 Fourth Ave., Huntington
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Wyoming			W. J. Ryan, Boyd Bldg., Cheyenne

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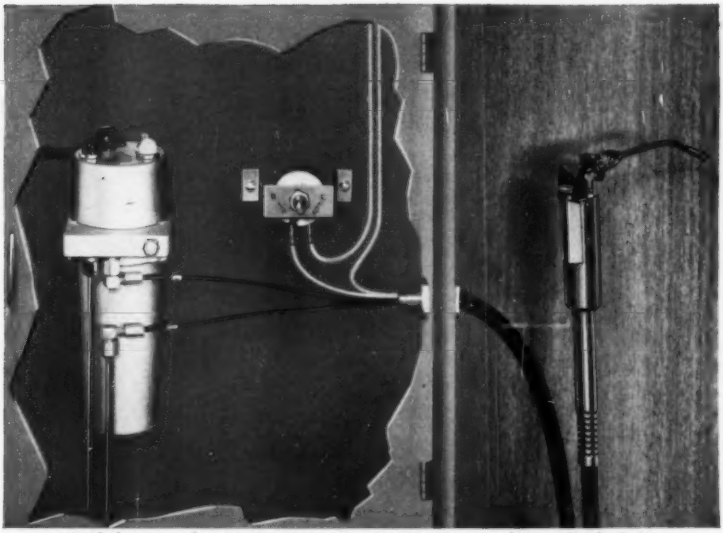

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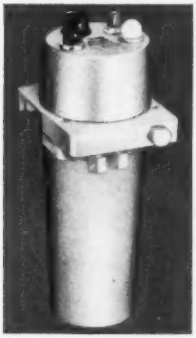

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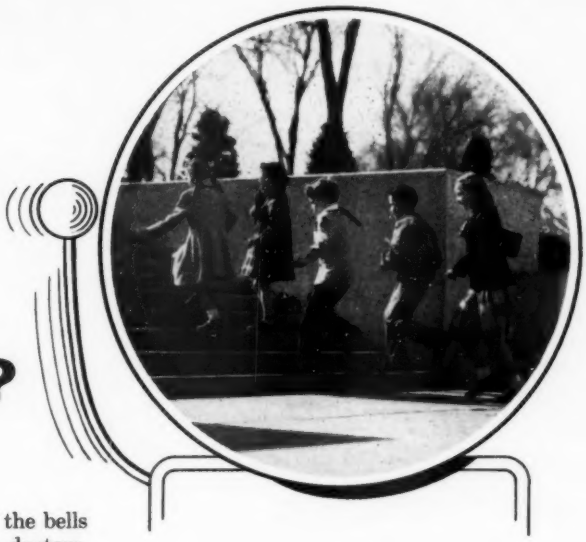
American Board of Oral Pathology	Dec. 3, 4 Apr. 6	Baltimore	D. A. Kerr, School of Dentistry, University of Michigan, Ann Arbor, Mich.
American Board of Oral Surgery	Dec. 5 Apr. 1-5	Chicago	L. M. FitzGerald, Roshek Bldg., Dubuque, Iowa
American Board of Orthodontics	Apr. 10-15	Denver	A. W. Moore, University of Washington, School of Dentistry, Seattle 5
American Board of Pedodontics	Nov. 28-Dec. 1	New York	R. L. Ireland, College of Dentistry, University of Nebraska, Lincoln 8, Neb.
American Board of Periodontology	Apr. 10-12	Indianapolis	B. O. A. Thomas, 668 Homer Ave., Palo Alto, Calif.
American Board of Prosthodontics	Aug. 14-19	Chicago	C. H. Jamieson, David Whitney Bldg., Detroit 26
Council on Dental Education, Dental Aptitude Tests	Jan. 13, 14		S. Peterson, 222 E. Superior St., Chicago 11
National Board of Dental Examiners	Dec. 5, 6		Grace Parkin, 222 East Superior St., Chicago 11

MEETINGS OF OTHER ORGANIZATIONS

Name	*Date*	*Place*	*Secretary or Chairman and Address*
Academy of Dentistry for the Handicapped	Feb. 5	Chicago	R. L. Holle, 3501 Cornell Pl., Cincinnati 20
Academy of General Dentistry	Feb. 7	Chicago	A. L. Knab, 8500 Stony Island Ave., Chicago
Academy of Oral Dynamics	Mar. 11, 12	Washington, D.C.	J. T. McSweeney, 140 E. 80th St., New York 21
American Academy of Crown and Bridge Prosthodontics	Feb. 4, 5	Chicago	W. E. Corry, 2165 Adelbert Rd., Cleveland 6
American Academy of Dental Medicine	Dec. 4	New York	G. F. Clarke, 554 Franklin St., Melrose, Mass.
American Academy of Dental Practice Administration	Feb. 2-4	Chicago	R. H. Campbell, 18595 Grand River Ave., Detroit 23
American Academy of Oral Pathology	Apr. 6-8	Ann Arbor, Mich.	R. J. Gorlin, School of Dentistry, University of Minnesota, Minneapolis
American Academy of Restorative Dentistry	Feb. 4, 5	Chicago	M. H. Mortonson, Jr., 735 N. Water St., Milwaukee 2
American Association of Dental Schools	Mar. 26-29	Boston	R. Sullens, 840 N. Lake Shore Dr., Chicago 11
American Association of Endodontists	Feb. 2-5	Chicago	E. C. Van Valey, 9 Rockefeller Plaza, New York 20
American Association of Industrial Dentists	Apr.	Los Angeles	E. R. Aston, Pennsylvania Dept. of Health, P.O. Box 90, Harrisburg
American Association of Orthodontists	Apr. 16-21	Denver	E. E. Shepard, 225 S. Meramec Ave., St. Louis 5
American Equilibration Society	Feb. 2	Chicago	R. C. Van Dam, 11431 S. Halsted St., Chicago 28
American Society for the Advancement of General Anesthesia in Dentistry	Mar. 27	New York	M. H. Feldman, 730 Fifth Ave., New York 19

FOR WHOM THE BELLS?



Hear the clamorous summons of the bells—calling pupils, teachers, nurses, doctors, librarians, clerks, maintenance-service people, administrators, and lunch room managers back for the fall term.

Listen again. Perhaps you may also hear the note of strident alarm in those bells. The future of an estimated 45 million boys and girls, young men and women is at stake. During the school year, each will grow in body and mind—each will change for better or worse.

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Name	*Date*	*Place*	*Secretary or Chairman and Address*
American Society of Geriatric Dentistry	Feb. 4	Chicago	P. G. Rubens, 55 E. Washington St., Chicago 2
Central Dental Association	Feb. 19-22	Aspen, Colo.	D. I. Muirhead, Hastings, Minn.
Chicago Dental Society	Feb. 5-8	Chicago	K. S. Richardson, 30 N. Michigan Ave., Chicago
Denver Dental Association	Jan. 8-11	Denver	G. L. Ogle, Republic Bldg., Denver 2
Fédération Dentaire Internationale, 49th Annual Session	July 9 15	Helsinki, Finland	G. H. Leatherman, 35 Devonshire Pl., London W.1, England
Great Lakes Society of Orthodontists	Nov. 27-30	Cincinnati	E. A. Cheney, 635 Applegate Lane, East Lansing, Mich.
Greater New York Dental Meeting (Thirty-sixth)	Dec. 5-9	New York	M. Purdy, 106-A Hotel Statler Hilton, New York
Greater Philadelphia Annual Meeting	Mar. 21-24	Philadelphia	M. Kohn, Sheraton Hotel, 17th St. & Pennsylvania Blvd., Philadelphia 3
International Association for Dental Research	Mar. 23-26	Boston	D. Y. Burrill, 311 E. Chicago Ave., Chicago 11
International Dental Meeting of Paris (Thirty-fourth)	Nov. 21-27	Paris	M. J. Boursier, 17, rue du Colisée, Paris 8e, France
Mid-Continent Dental Congress	Nov. 27-30	St. Louis	J. E. Brophy, 8013 Maryland Ave., St. Louis 5
Mid-West Society of Periodontology	Feb. 4	Chicago	L. Howlett, Jr., Medical Arts Bldg., Springfield, Mo.
New Orleans Dental Conference (Thirteenth)	Nov. 13-16	New Orleans	M. R. Matta, Maison Blanche Bldg., or J. O. Kuebel, Jr., 1636 Louisiana Ave., New Orleans
Northeastern Society of Orthodontists	Nov. 13-15	Boston	D. Mossberg, 36 Central Park S., New York 19
Northeastern Society of Periodontists	Nov. 4	New York	I. W. Scopp, V. A. Hospital, First Ave. at E. 24th St., New York 10
Ohio Dental Society of Anesthesiology	Nov. 12, 13	Columbus, Ohio	R. I. Weaver, 316 Michigan St., Toledo 2
Rowe Smith Memorial Foundation	Dec. 2-5	Karnack, Texas	C. G. Smith, Executive Council, Rowe Smith Memorial Foundation, 501 State National Bank Bldg., Texarkana, Ark.
Southeastern Academy of Prosthodontics	May 18-21	Bal Harbor, Miami Beach, Fla.	J. H. Allgood, 516 Military Rd., Columbus, Miss.
Western District Dental Group (International)	Nov. 20-26	Buenos Aires, Argentina	M. Elkin, Tucuman 1694, Buenos Aires, Argentina

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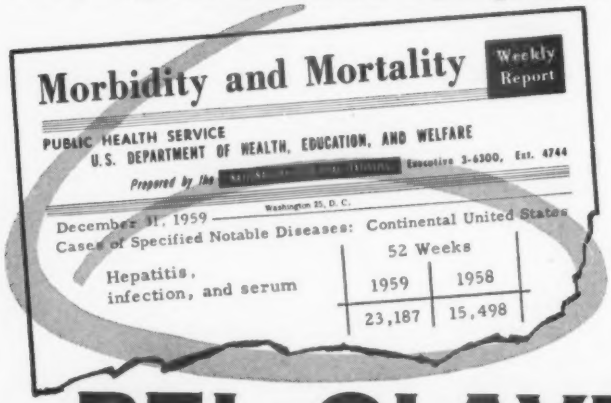

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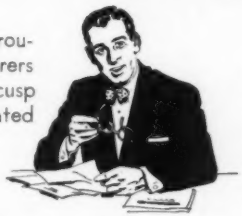

Don't miss this provocative November Number of the Dental Clinics of North America

Sumter S. Arnim, D.D.S., Consulting Editor

Three times a year the widely-used *Dental Clinics of North America* bring to your desk a 250-page illustrated Symposium of vital and current interest. You will find each page packed with sound, concise, clinical advice from leading dental centers and outstanding men in the field — telling you *what* to do, *when* to do it and *how* to do it. The current November Number, one of the most unusual and provocative ever offered in the Dental Clinics, gives you differing viewpoints on 20 different problems of today's practice of dentistry. The topics covered range over most of the fields of clinical dentistry — operative dentistry, periodontics, roentgenography, orthodontics, prosthodontics. You'll find stimulating discussions of opposing ideas on the management problems you face daily. See the partial contents opposite for a sample of the articles included. Others cover *Extraction in Orthodontic Treatment, Hazards in Roentgenography, What the General Practitioner Should Know About Orthodontics,* etc.

In March, 1961, the Dental Clinics will present some 20 articles on many aspects of *Practice Administration.*

Examples of Topics Discussed

The Establishment of Occlusion

The Articulator and the Patient: *Ernest R. Granger* — Using the Patient's Mouth in Occlusal Rehabilitation: *Douglas M. Lyon*

Implant Dentures

Rationale of the Mandibular Implant Denture: *Norman I. Goldberg, Aaron Gershkoff* — A Plea for Caution and Research: *H. Milton Rode*

Impression Materials

Rationale of Non-elastic Impression Materials: *Harold J. E. Lantz* — Elastic Impression Materials for Complete Dentures: *L. Rush Bailey*

Accelerated Handpiece Speeds

Advantages of High Speed and Ultra Speed in General Dentistry: *Harold C. Kilpatrick* — The Potential Abuse of High Speed Techniques: *Harold R. Stanley, Herbert Swerdlow*

The Treatment of Carious Teeth

The Case for Extracoronal Restorations: *William Lefkowitz* — Disadvantages of Full Coverage: *D. James McCabe, Vernon W. Rinne*

Cavity Sterilization

A Recommended Procedure: *Henry A. Bartels* — An Unnecessary Step: *Sidney B. Finn*

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The Case for Including the Surgical Approach: *Saul Schluger* — Disadvantages of Surgical Techniques: *Frank E. Beube*

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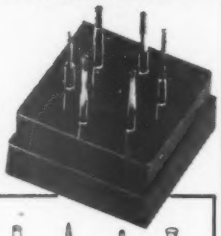

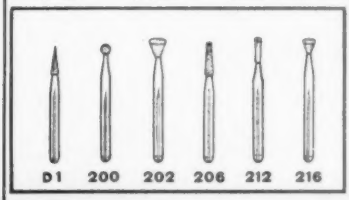

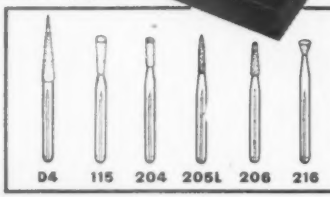

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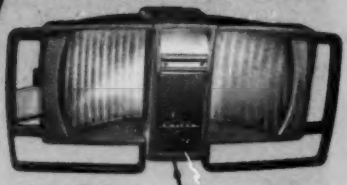

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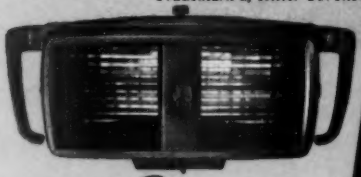

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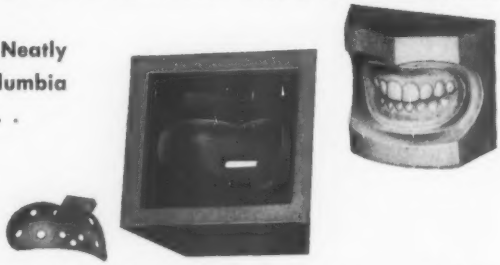

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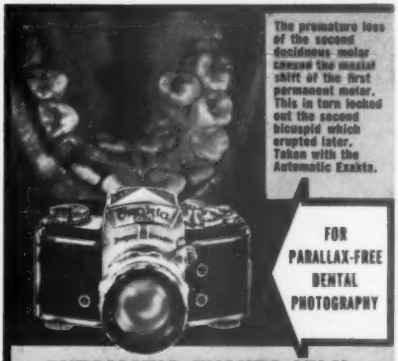
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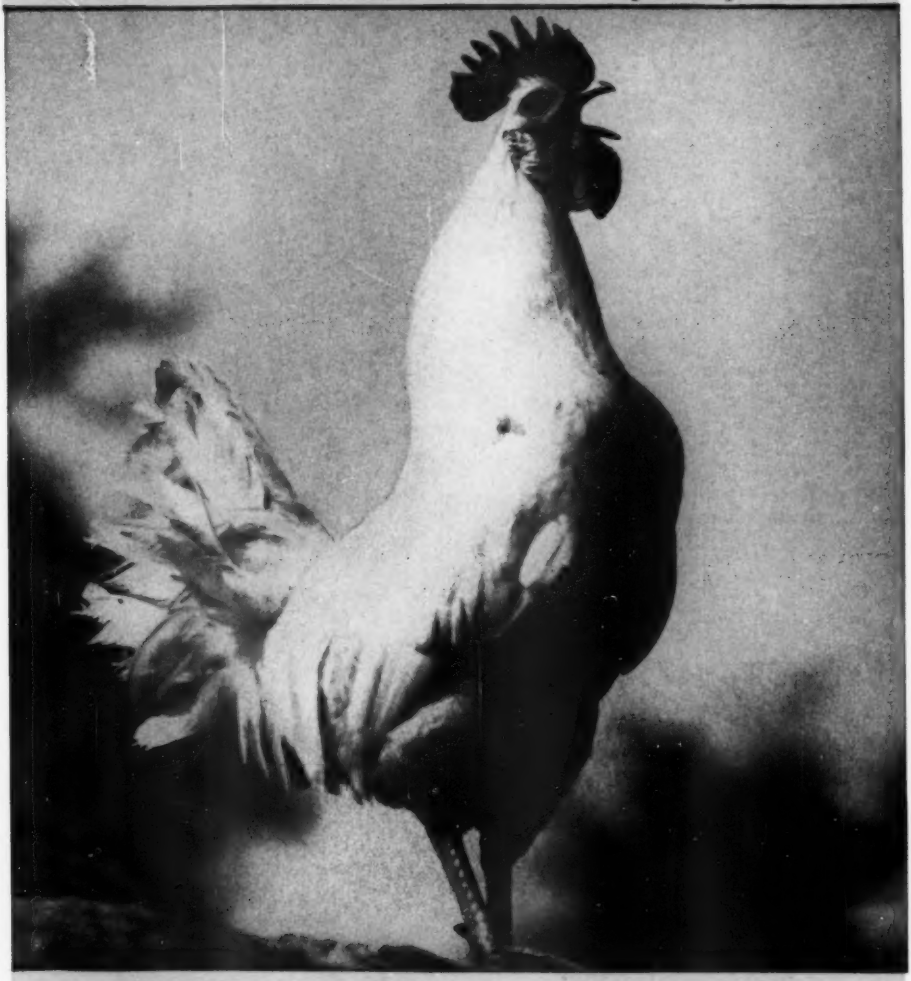

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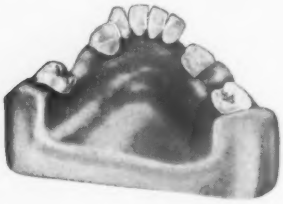
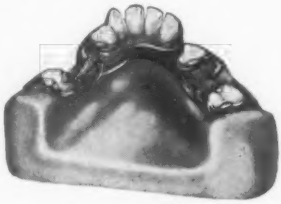
One malpositioned tooth, the right second bicuspid, tilted lingually about 45°, at first appeared to block any attempt to seat a partial denture.



However, after surveying and analyzing this case on the Ney Surveyor Parallelometer, it was found that, despite the badly tilted bicuspid, a gold partial could be designed to provide satisfactorily the necessary features of bracing, retention and support.

The strut which runs from the gold framework to the right lateral defines an unusual space between the lateral and the supplied tooth. Surveyor analysis definitely pointed out that the case could be seated only if it were deliberately designed to create such a space. This was, in fact, the key to the whole problem.



The final design included ring clasps on the two molars and back action clasps on both bicuspids, with buccal truss arms instead of the more usual lingual truss arms. The extremely difficult undercut condition called for a material with flexibility as well as strength, and Ney-Oro G-3 Casting Gold was a wise and successful choice.

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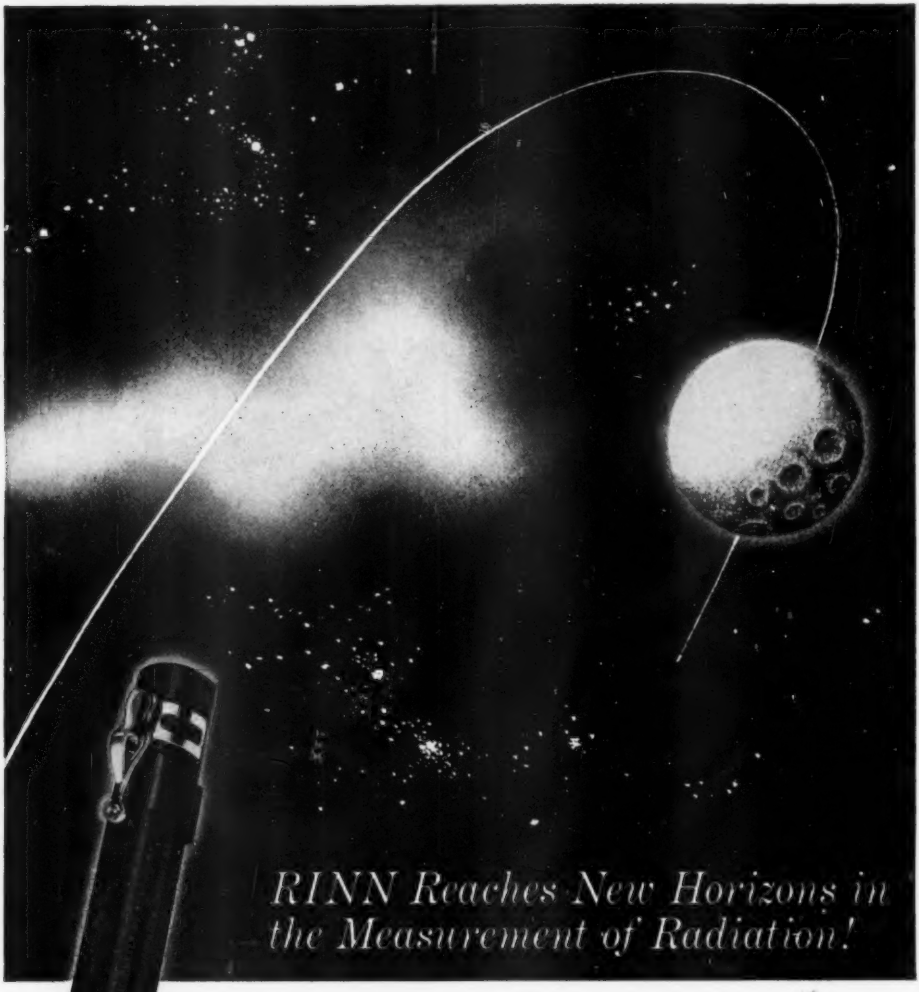

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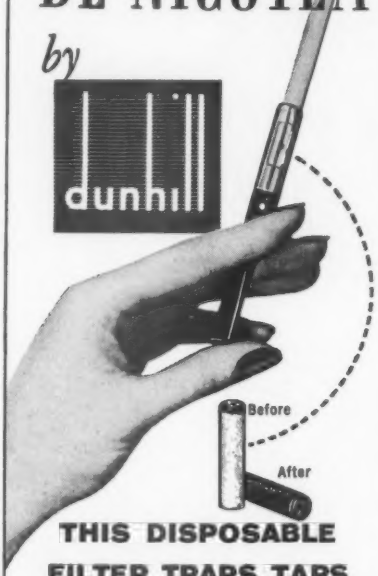

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1. Cobe, H. M., Oral Surg., Oral Med., Oral Path., Vol. 13, No. 6, (June, 1960), pp. 678-685.
2. Harkins, H. P., The Eye, Ear, Nose & Throat Monthly, Vol. 38, (Nov., 1959), pp. 942-944.
3. Cobe, H. M., Cohen, D. Walter, Hattler, A. B., Pa. Dent. Jrl., Vol. 24, (Jan., 1959), pp. 12-18

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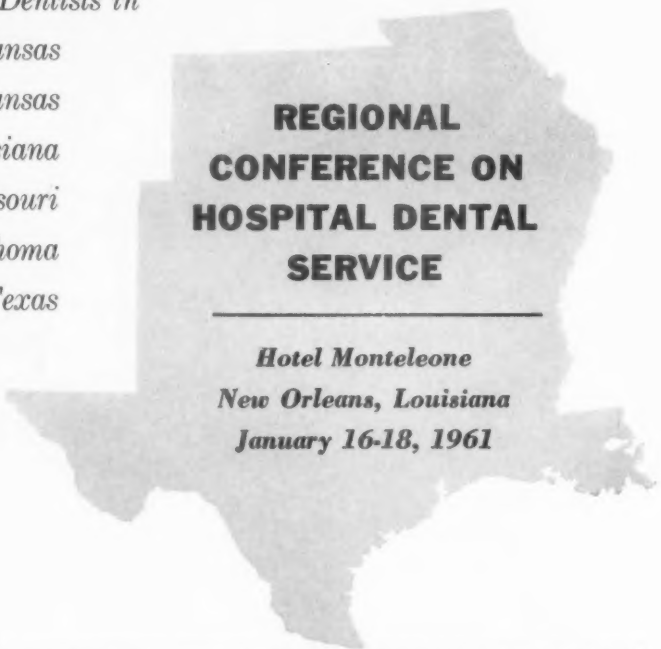

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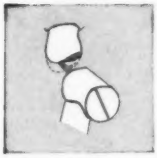

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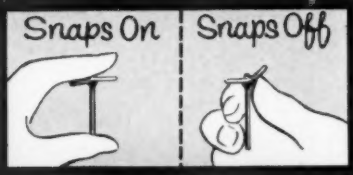

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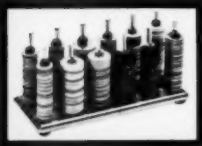

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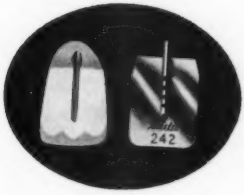

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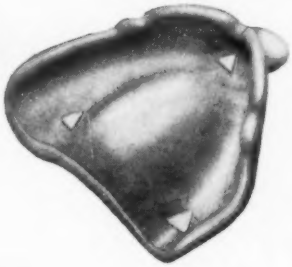

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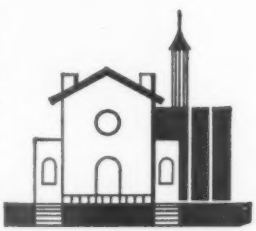

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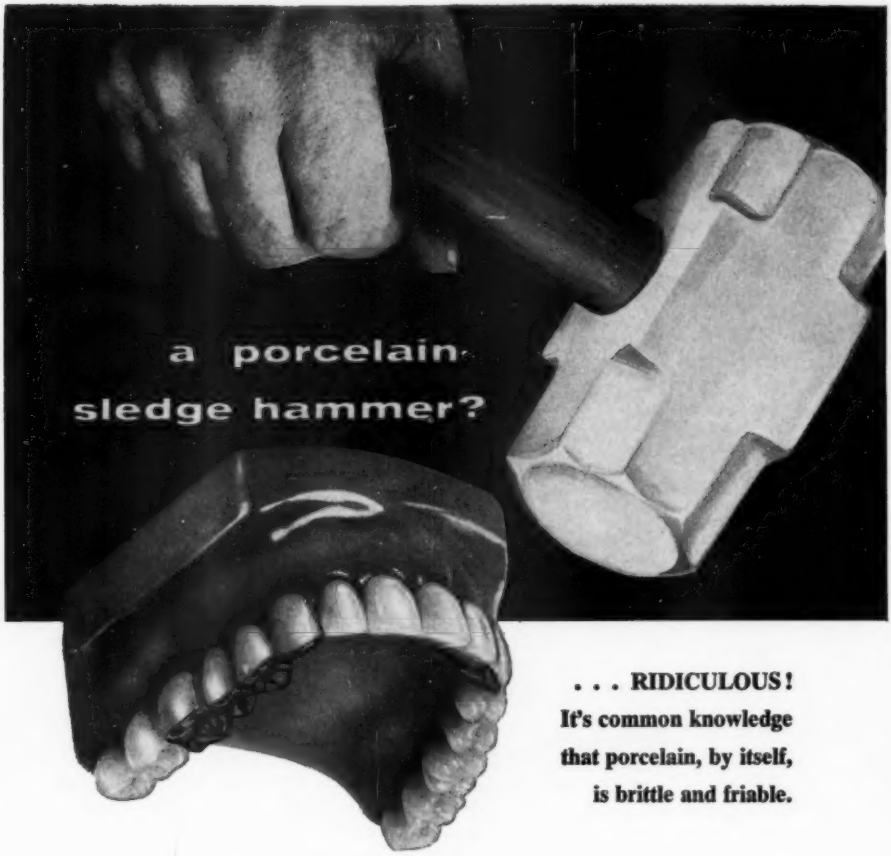

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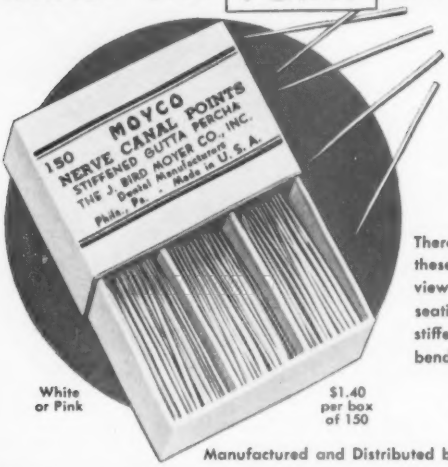

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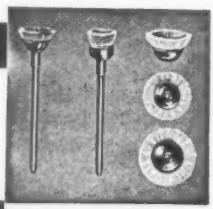

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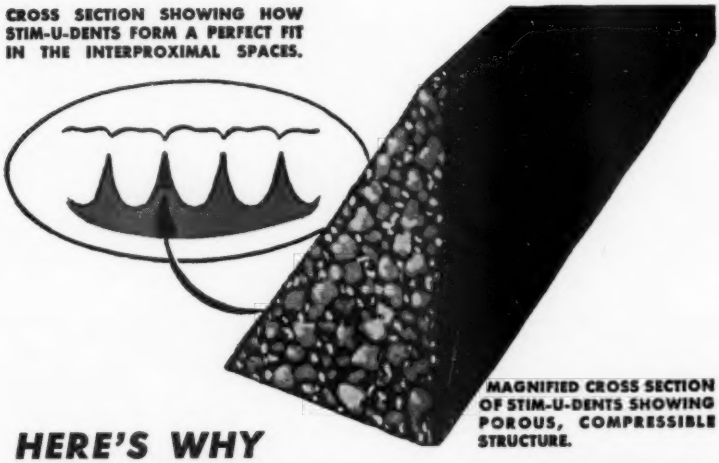

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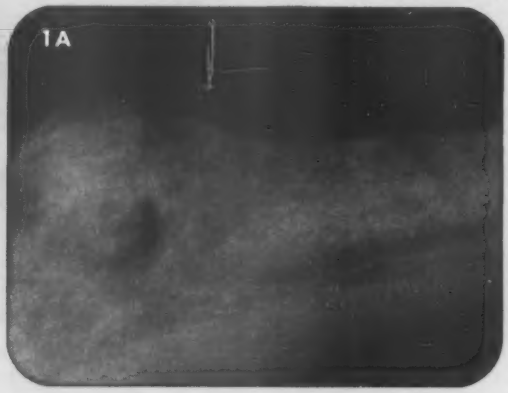

Figures 1, 1A: Periapical radiographs of a mandibular *fibrous dysplasia* with varying densities within a fairly well-circumscribed radiolucency which has a distinctive hyperostotic border at "A".

*** *Radiographs and caption material from the Division of Stomatology, School of Dental and Oral Surgery, Columbia University, New York City.***

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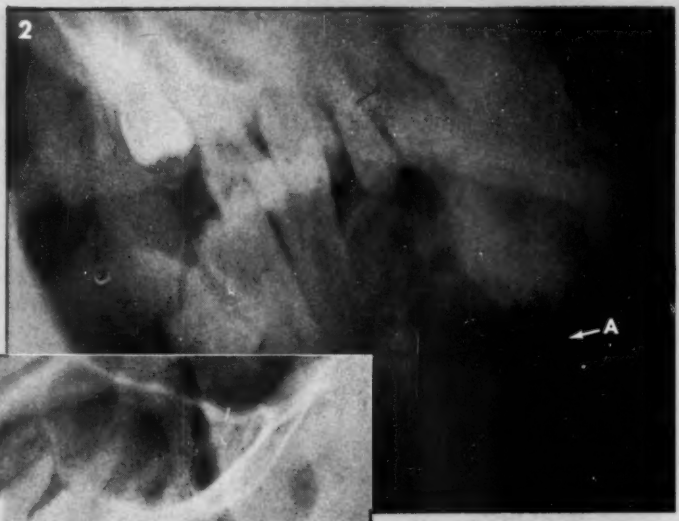

Figure 2: An extraoral radiograph of the body of the mandible containing a large, deforming *fibrous dysplasia* (note expanded outlines at "A"). Here the tumorous mass consists of irregular, patchy opacities of varying density in a radiolucent enclosure.

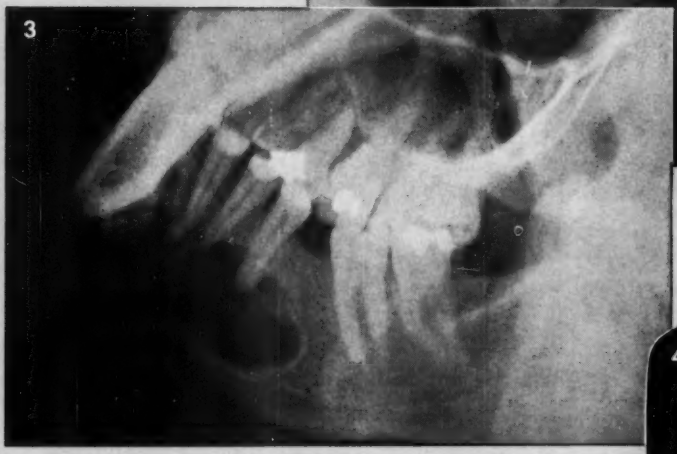

Figure 3: An extraoral radiograph of a *fibrous dysplasia* of the mandible simulating a periapical infection. The circular-shaped radiolucency, its apposition to the apices of the bicuspids and its narrow, hyperostotic periphery strongly suggest a diagnosis of radicular cyst. However, both teeth are normal and vital.

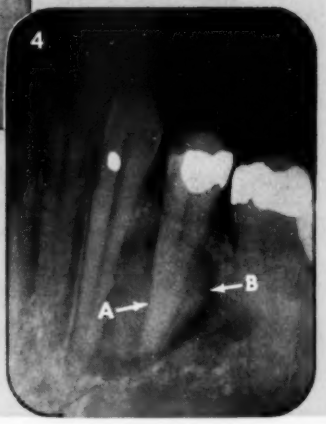

Figure 4: A periapical radiograph of *fibrous dysplasia* which appears to be enveloping the root of a first bicuspid. Note the distinct opacity at "A" surrounded by a peripheral radiolucency at "B".

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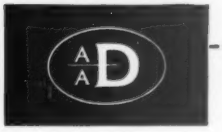

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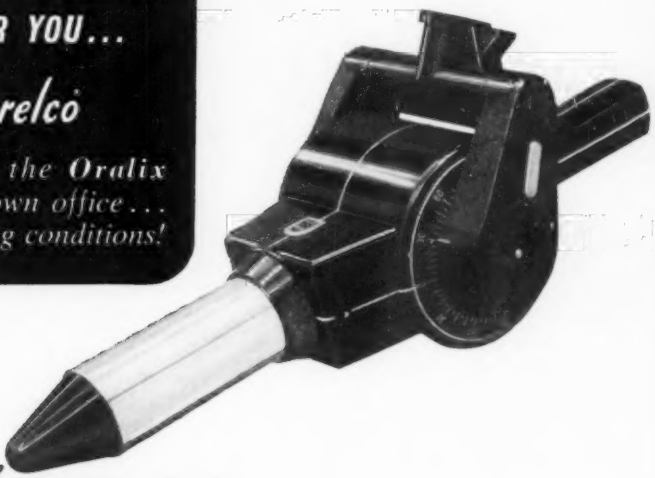

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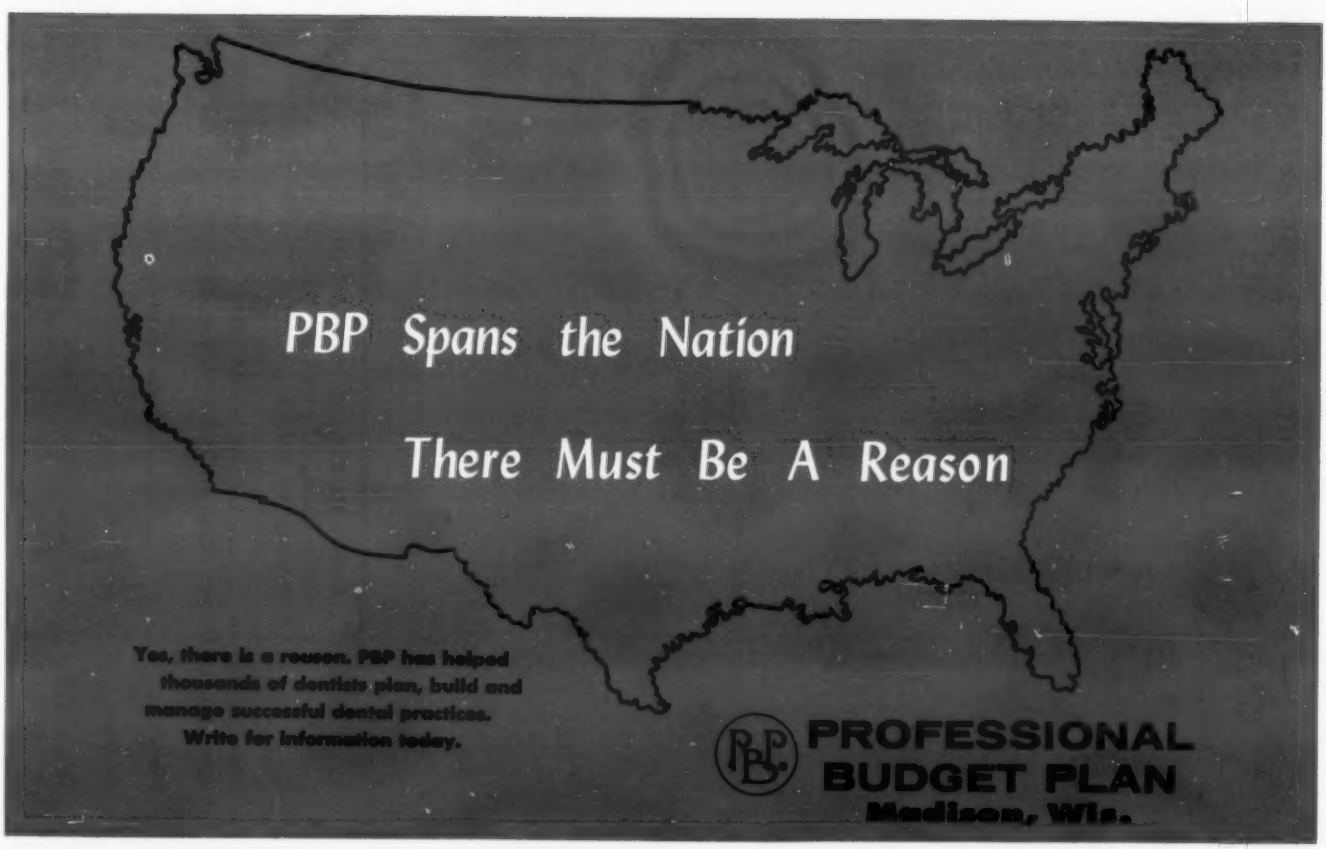
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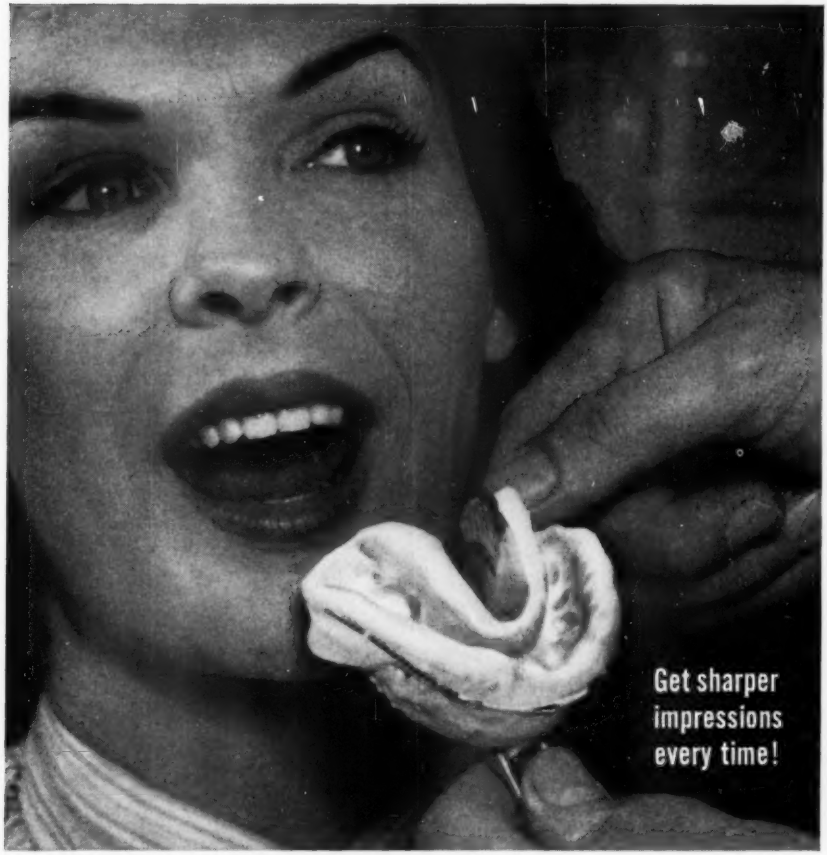

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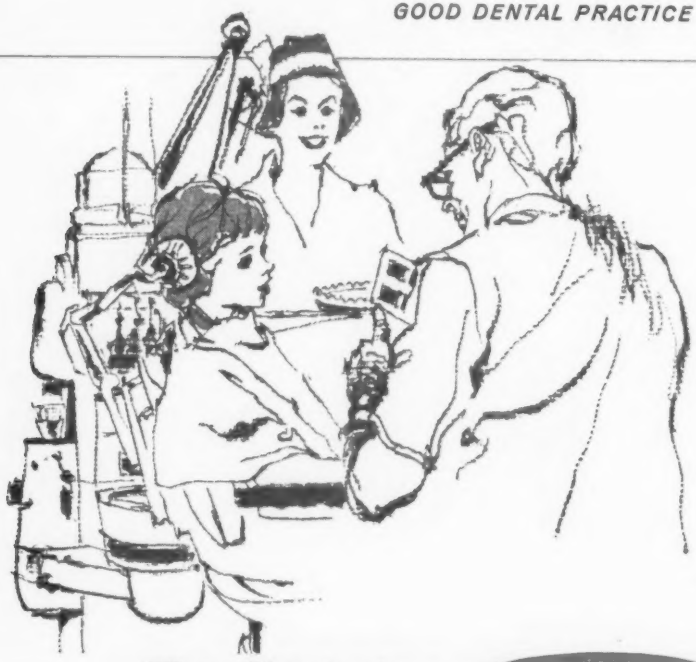

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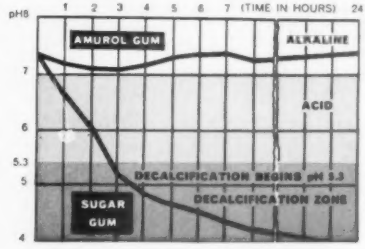

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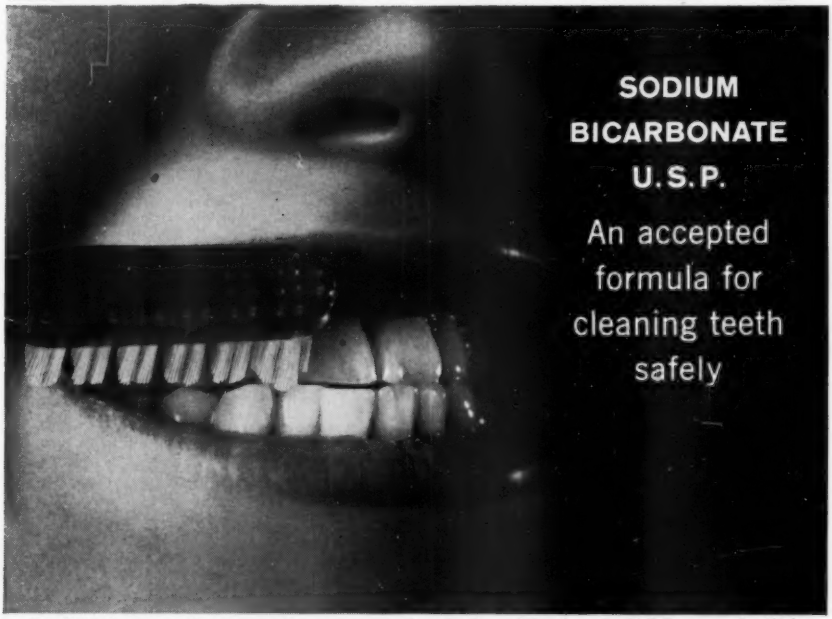

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1. Accepted Dental Remedies, 24th Edition, pg. 131, 1959

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CALIFORNIA — Wanted. Qualified general practitioner for group practice in southern California. Address A.D.A. Box No. 777.

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CALIFORNIA — Berkeley. Wanted. Associate for general practice. High percentage of gold work. Busy, well established three-chair office. Address A.D.A. Box No. 117.

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CALIFORNIA—San Diego. Dentist wants associate who will buy into and within one year take over practice including building and real estate. $5,000 needed; $52,000 package. Practice grossed over $38,000 in 1959—ten per cent ahead so far. Further information on request. Address A.D.A. Box No. 118.

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University of Malaya—Singapore. Applications are invited for appointment to the Chair of prosthetic dentistry and to a Lectureship/Assistant Lectureship in dentistry with special reference to orthodontics. Salary: Chair, between £2268 and £2548 per annum at a fixed point to be determined by qualifications and experience; Lectureship: £1295x49-1442/1540x56-1988 per annum; Assistant Lectureship: £1148x49-49-1246 per annum. Allowance: expatriation, Professor, £378 per annum; Lecturer/Assistant Lecturer: £280 per annum; variable (temporary) in range £210-£560 per annum (figures given in Sterling). Passage for appointee, wife and children under 12 years of age. Part furnished quarters at reasonable rent. Provident Fund Scheme. Detailed applications (9 copies) naming three referees by November 30, 1960 to Register, University of Malaya, Singapore, Cluny Road, Singapore 10, from whom further particulars may be obtained.

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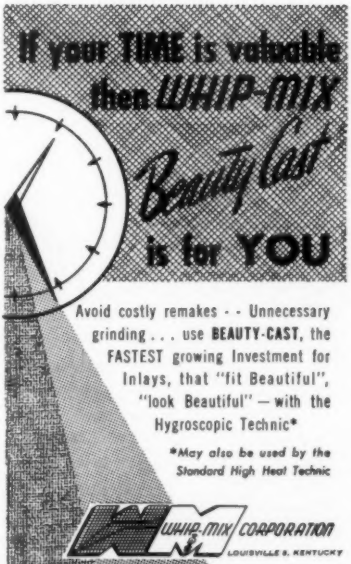
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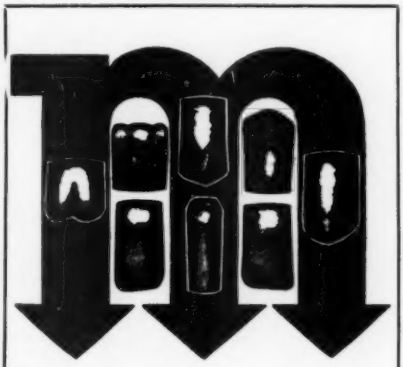

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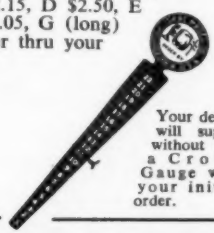

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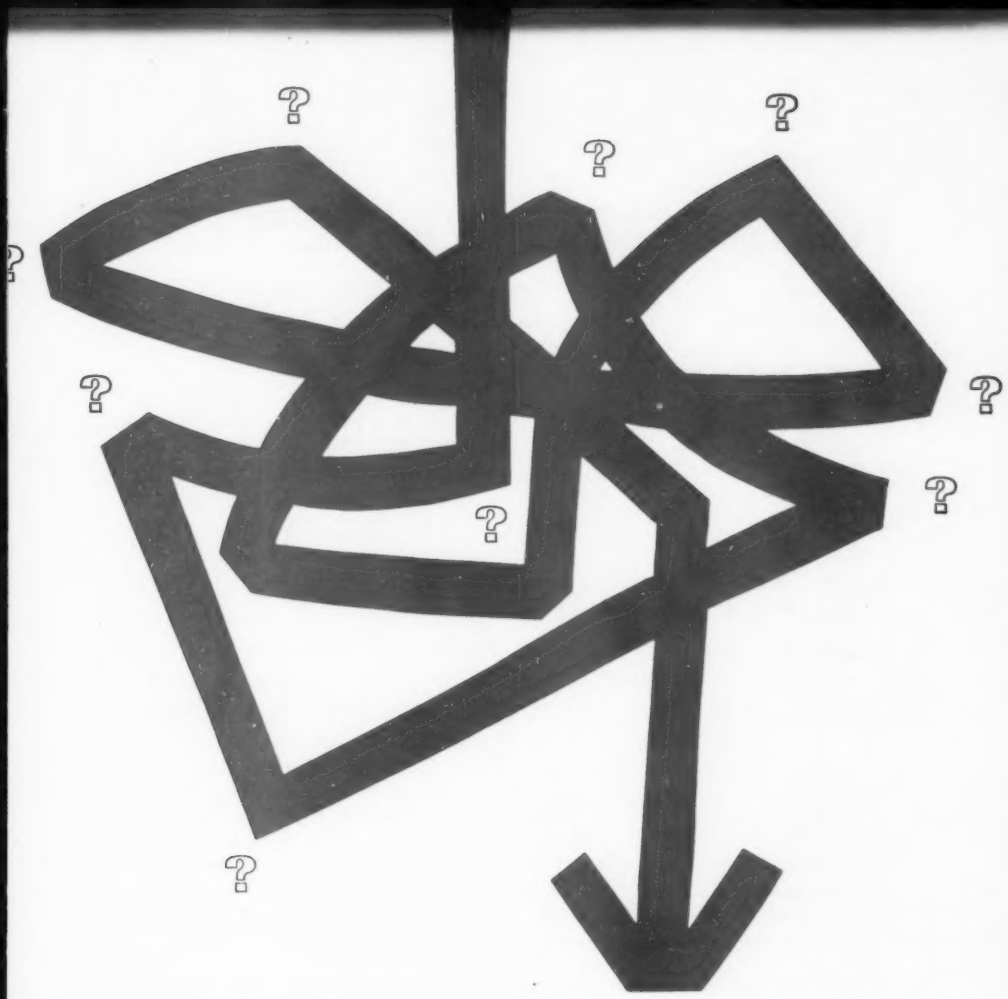

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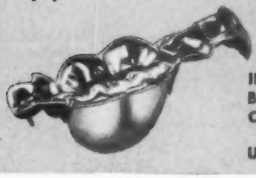

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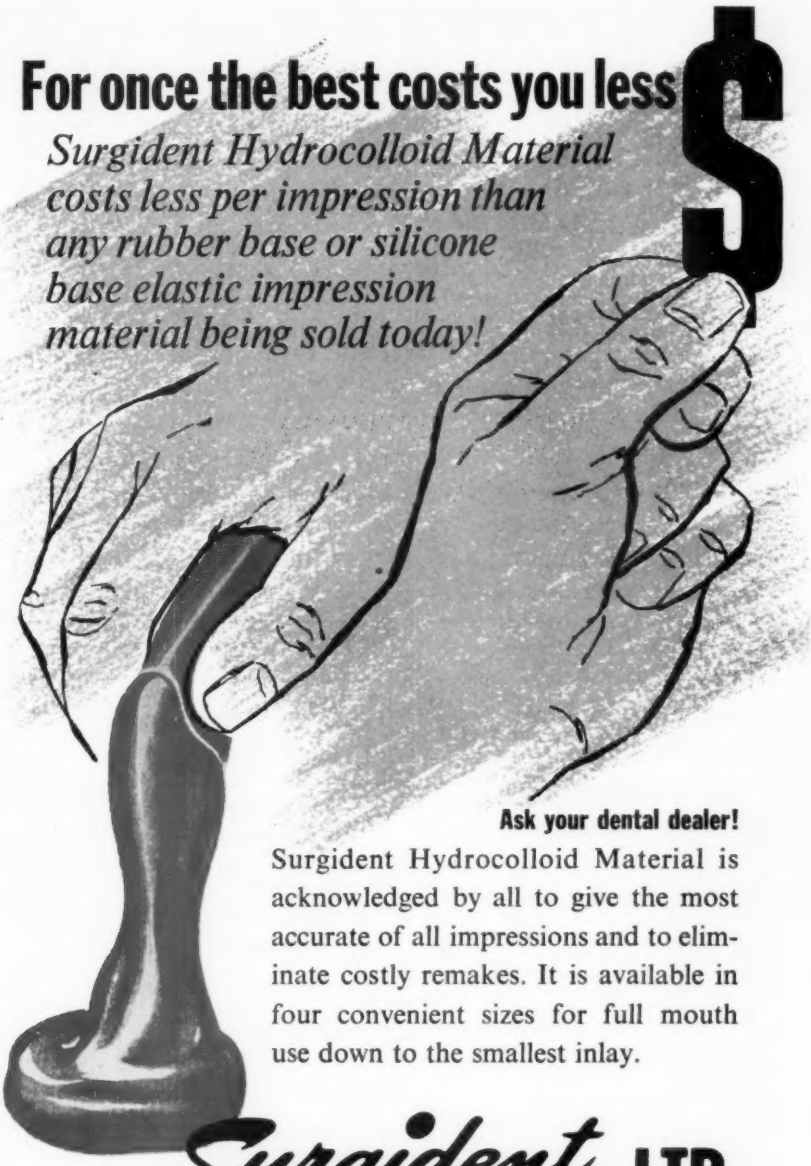

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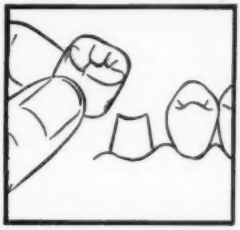
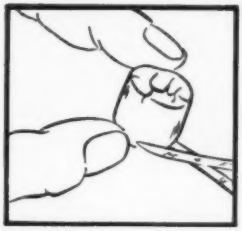


1 Select crown to fit snugly over prepared tooth



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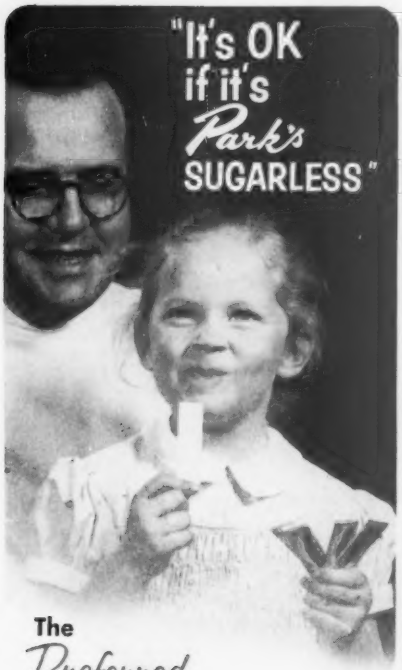

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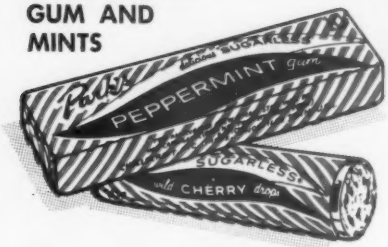

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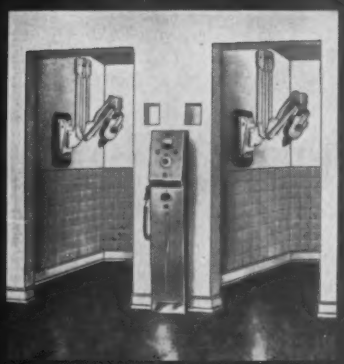

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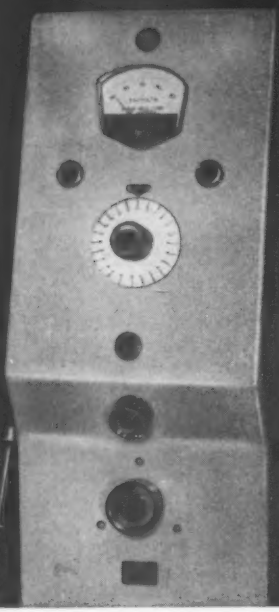

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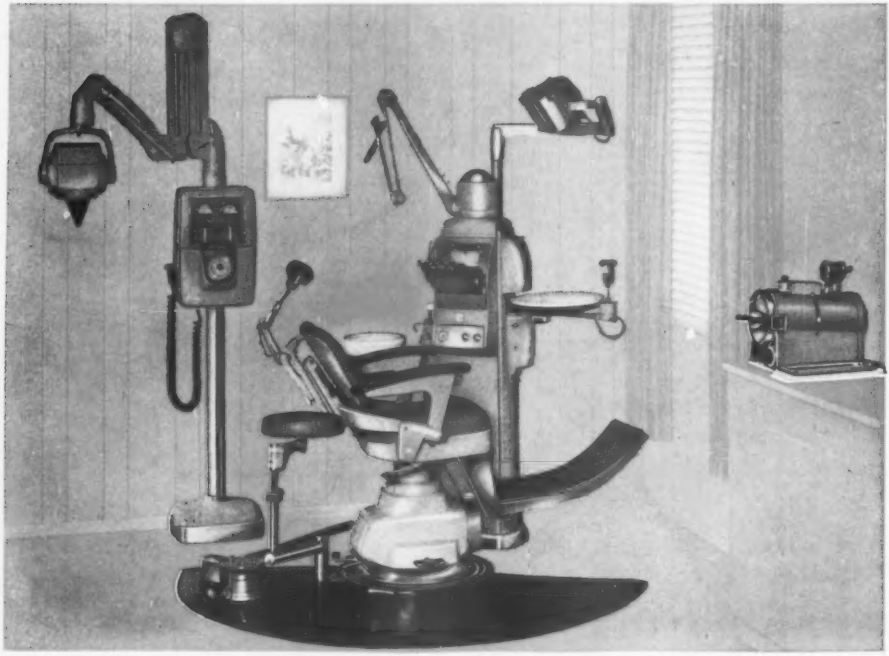

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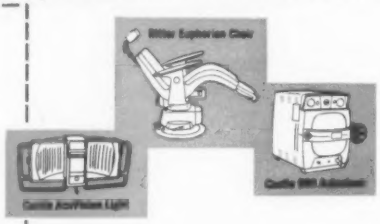

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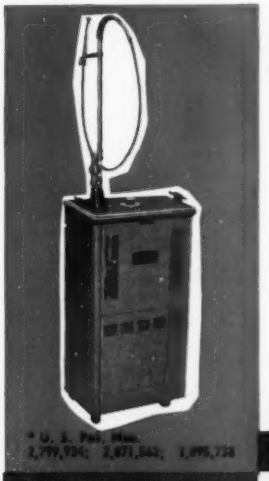

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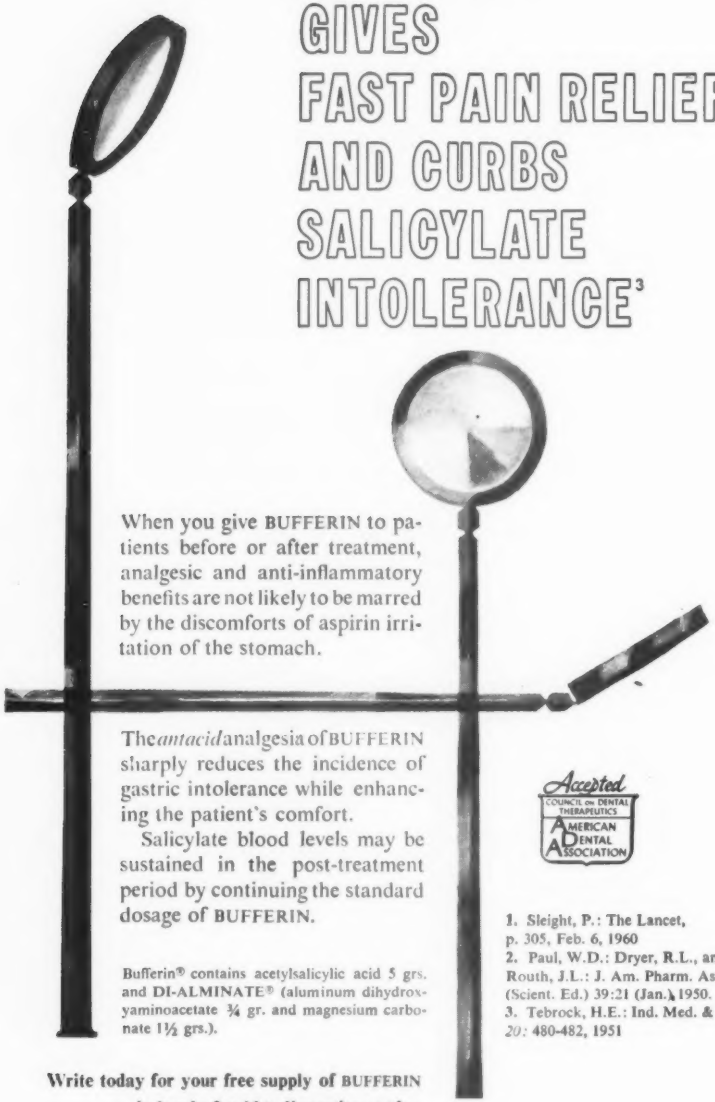

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